The Canadian
Medical Association Journal

Vol. 38 TORONTO, FEBRUARY, 1938 No. 2

CARCINOMA OF THE RECTUM AND RECTO-SIGMOID

(A REPORT OF 89 CASES WITH SPECIAL REFERENCE TO ELECTRO-COAGULATION IN SELECTED CASES)

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CANCER of the rectum is a disease which can be diagnosed accurately. The growth is usually of low malignancy, is slow to metastasize, is more or less accessible, and hence is amenable to surgical extirpation. Two chief obstacles bar the way to the attainment of a high record of cures. First: rectal bleeding, the earliest and most constant symptom of cancer, is ignored, being associated in the minds of the laity with hæmorrhoids, its most common source. Second: rectal examination is not always regarded by the profession as an essential part of a complete routine physical examination. The significance of these two facts cannot be too greatly emphasized. It is regrettable that an average of nine to thirteen months elapse before patients seek advice, and that all too often treatment is given for hæmorrhoids, when the insertion of a finger into the rectum would lead to the diagnosis of carcinoma.

Even when the diagnosis is made early there are still barriers to the institution of adequate treatment. Cancer of the rectum is too often regarded as hopeless, not only by the laity but by some members of the profession as well. The former can scarcely imagine life to be compatible with the removal of the rectum, and regard a colostomy as an intolerable makeshift. The latter hesitate to advise radical treatment, because they envision a mutilating operation, a prohibitive mortality rate, a prolonged painful convalescence, and a high rate of recurrence. The removal of the rectum and the formation of an adequately functioning colostomy is surely not as mutilating an operation as the amputation of a limb. A mortality rate of 9 to 25 per cent in an otherwise lethal disease is not prohibitive. A month or two in a hospital is surely greatly to be preferred to the inevitable many months of cramps, diarrhœa, tenesmus, and intolerable rectal and pelvic pain, before the end comes. And finally, figures such as Miles'[1] 33.7 per cent of five-year cures, and Rankin's[2] 24.1 per cent of ten-year cures, cannot be said to exhibit a high enough rate of recurrence to discourage either the patient from accepting, or the surgeon from applying, adequate radical treatment.

To duplicate results such as Miles and Rankin have obtained one must possess a thorough knowledge of the anatomy of the large bowel and pelvis, of the pathology of carcinoma in the sites under discussion, of the clinical signs and symptoms, of special methods of investigation, and finally of the indications for and the end-results achieved by the various surgical methods.

ANATOMY

The rectum is from five to six inches long. It lies in the hollow of the sacrum, and extends from the third piece downward and forward to join the anal canal about one and a half inches in front of the tip of the coccyx. It is encased in a loosely-attached sheet of pelvic fascia, thin above the ampulla, more dense around the ampulla. Between this layer and the longitudinal muscle coat lie the retro-rectal and para-rectal lymph glands. These are generally the first to be invaded by disease arising in the rectum. The upper third of the rectum is covered with peritoneum anteriorly, the sides

are only partially covered as the peritoneal reflection slopes forward and downward. The rectum is narrowed above at its junction with the sigmoid. The two coloured plates (Figs. 1 and 2) illustrate the two types of recto-sigmoid that are encountered. A growth in the ampulla may be relatively advanced before causing obstruction, while a tumour at the recto-sigmoid junction produces early obstruction.

The arterial blood supply and the venous drainage of the rectum and anus consist of the superior, middle and inferior hæmorrhoidal vessels. The superior hæmorrhoidal artery is located in the meso-sigmoid just in front of the sacral promontory, slightly to the left of the mid-line, and lies close to the left ureter. The proximity to the ureter usually does not give rise to difficulty during operation, as the vessels pull away from the ureter when the sigmoid is lifted out of the pelvis. The superior vessels supply and drain all of the rectum except a portion of the anterior wall in relation to the prostate or vagina. The latter portion is supplied by the middle group. The anal canal is supplied by the inferior group. There is a free anastomosis between all three groups and they communicate with both the systemic and the portal circulations.

The lymph drainage corresponds to the venous drainage, and is of course important in the spread of malignancy. There are three mural plexuses, one in the submucosa, one between the circular and longitudinal muscles, and one outside the longitudinal coat. The circular arrangement of these lymphatics, and also the fact that tumour cells first invade the circular muscle coat, explain the annular character of many large bowel tumours. Further details of the lymphatic spread will be discussed under the heading of pathology.

It is important to remember that the ureters are closely related to the rectum. They lie roughly one and a half inches from the side of the rectum as they pass downward and forward from the bifurcation of the common iliac artery. They adhere to the pelvic peritoneum until the ischial spine is reached, and then turn medially to be crossed superficially by the ductus deferens in the male, and the uterine artery in the female. They empty into the bladder about an inch in front of the anterior surface of the terminal portion of the rectum.

PATHOLOGY

Pre-cancerous lesions.—While adeno-carcinoma may arise from apparently normal tissue, there exists strong evidence to support the view that many malignant growths of the large bowel have their origin in pre-existing adenomatous polypi. The distribution of cancer, eight times as frequent in the sigmoid and rectum as in other portions of the bowel, corresponds closely to the distribution of polypi.

A recent case of congenital polyposis of the colon, in a boy of 22, had moderately advanced carcinoma of the rectum when first seen (Fig. 1). His mother, two brothers and three sisters out of a family of thirteen have diffuse polyposis. In 1919 Dr. Neil John Maclean[3] reported the case of a woman of 24 years with advanced rectal carcinoma. Her two brothers had died of carcinoma of the bowel at the ages of 7 and 11 respectively. These were undoubtedly examples of malignant change in congenital polyposis.

Single polypi are also pre-malignant.

A man aged 53 was found on routine examination for hæmorrhoids to have two benign polypi of the sigmoid. In the family history it was noted that one brother had died of carcinoma of the colon at the age of 60, and another brother had been operated upon for carcinoma of the recto-sigmoid a year previously.

Another patient reported ten years ago with acute obstruction of the transverse colon which was thought due to intussusception because of the history, examination, x-ray evidence of obstruction, and the fact that he obtained dramatic relief of symptoms during the administration of a barium enema. He refused operation. Five years later he returned with chronic obstruction. Laparotomy revealed a polyp of the transverse colon with moderately advanced malignant change.

Fitzgibbon and Rankin[4] reported a series of cases in which previously benign polypi had become malignant. Dukes found polypi in 75 per cent of sigmoids and recti resected because of cancerous growths. At the Presbyterian Hospital, New York, 26 per cent of cases of rectal and colonic polypi also exhibited carcinomatous lesions.

Polypi have been classified by various observers into three groups: benign, relatively benign, and malignant. The first group have long stalks and are covered by a pink shiny normal-appearing mucosa. The second group are cauliflower in type, having a granular mucosa. They are deep red in colour due to the vascularity of the thick villous processes that make up their structure. The third group are small, plump and relatively fixed on a broad base. They are a dark reddish purple colour, are often ulcerated, and they bleed readily. The first group remain benign for years. The second group tend to undergo malignant change early. The third group are malignant from the beginning.

When chronic ulcerative colitis is complicated by colitis polyposa the polypi undergo malignant change in a small percentage of cases. In one such case which came under our observation the history dated back 12 years. Rectal and cæcal carcinomata developed in inflammatory polypi.

Development and spread of rectal carcinoma.—Squamous epithelioma occurs in the anal canal but is very rare. Malignant melanoma, arising in the rectum, is rarer still. Adeno-carcinoma is by far the commonest malignant neoplasm found in the rectum and recto-sigmoid. It arises either from the crypts of Lieberkuhn or from a pre-existing polypus. In the initial stages a tumour of this type tends to grow into the lumen of the bowel. As the proliferation of cells progresses it first infiltrates the submucosa, then breaks through into the intermuscular spaces and their lymphatics. It tends to encircle the bowel rather than to spread in

Fig. 1.—Congenital polyposis of rectum and colon, with grade 2 adeno-carcinoma involving lower portion of rectum. (Six members of a family of thirteen had diffuse polyposis).

Fig. 2.—Large ulcerating carcinoma of the rectum, associated with multiple small polypi of sigmoid. (Symptoms eleven months' duration).

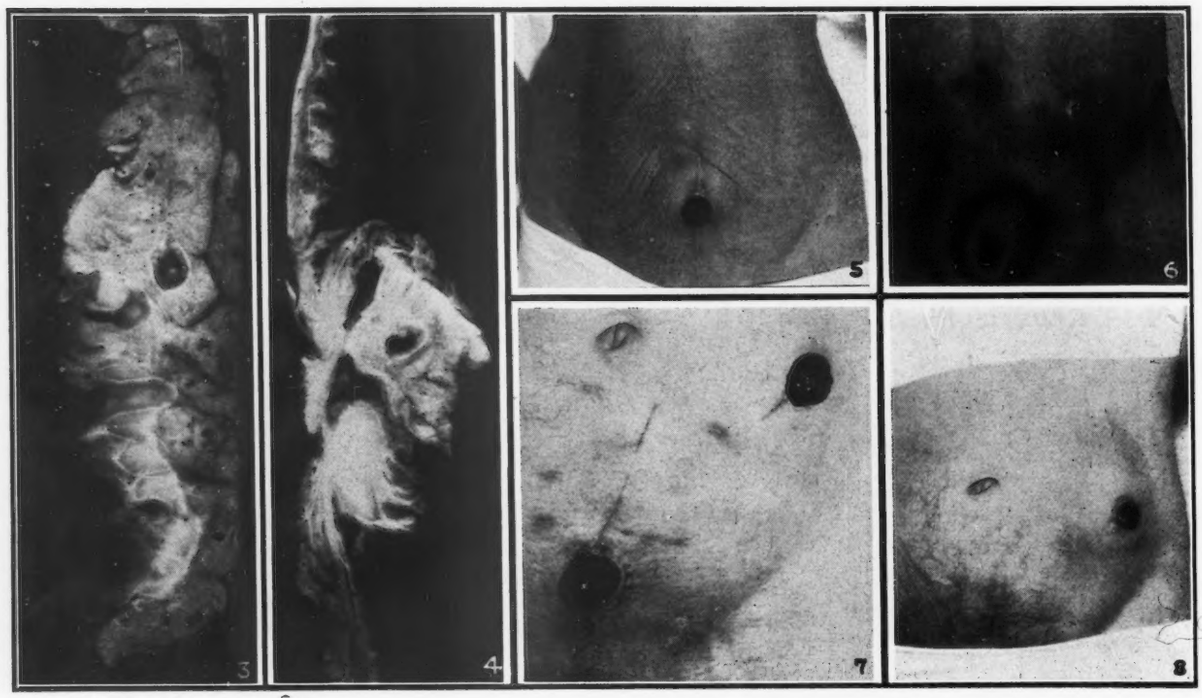

Fig. 3.—A large inflammatory tumour of the recto-sigmoid, showing multiple diverticula. The mass was honeycombed by inter-communicating tracts and there was marked peri-diverticular fibrosis. The mucosa is thrown into thick deep circular folds by the foreshortening of the bowel, the result of the fibrous contracture. These thick folds were congested and ulcerated. Patient gave a history of chronic diverticulitis extending over a period of many years (proved radiographically), but had been passing gross blood and pus for six months prior to our examination. **Fig. 4.**—This illustrates a recto-sigmoid tumour produced by chronic diverticulitis, a condition which may be difficult to distinguish from carcinoma. **Fig. 5.**—Permanent colostomy in midline. One-stage abdomino-perineal operation. Sigmoid brought out through left paramedian incision. **Fig. 6.**—Blind, single-barrelled no-loop colostomy, done under local anæsthesia, in debilitated patient without obstruction, as preliminary to the second-stage abdomino-perineal resection (rarely necessary). **Fig. 7.**—Preliminary double colostomy for obstructive lesion of the recto-sigmoid (Lahey procedure). **Fig. 8.**—Permanent inguinal colostomy after the second-stage abdomino-perineal operation. The first-stage done by Lahey's method.

the longitudinal axis. It has been estimated that an average tumour takes six months to grow half way around the rectum and a year to encircle it completely. The structures lying anterior to the rectum, the uterus and vagina in the female, the prostate, seminal vesicles and bladder in the male, are all liable to invasion by direct extension of a rectal carcinoma. Relentless as is the local extension of the growth, a more sinister method of dissemination may at any time take place. Lymphatic vessels become permeated, the cells travel along these to the regional lymph nodes, and thence to more distant glands. Miles has shown that the lymphatic spread may take place in three directions—downward, laterally, and upward. The downward spread occurs chiefly in tumours situated low in the ampulla or in the anal canal, but may also take place when tumours higher in the canal have blocked the upward paths. *By this route metastases may reach the inguinal glands.*

Lateral spread may occur from any tumour of the rectum. The metastases travel along the upper surface of the levatores ani outside the parietal pelvic fascia to the hypogastric glands, and occasionally to the obturator glands. The latter are situated in the obturator foramen, and are not attacked by any of the surgical methods employed for the removal of a diseased rectum. Upward spread is the most common route, since every tumour of the anus, rectum, and recto-sigmoid has direct lymphatic connections leading upward. The glands involved are the retro-rectal and para-rectal groups, the hypogastric group, and the glands of the meso-sigmoid. From the latter two groups the growth may spread to the pre-aortic and the lumbar groups of glands.

Besides the local and the lymphatic spread the tumour cells may at any time enter the blood stream and be carried by way of the portal veins to the liver. Such is the sequence of events in carcinoma from early to advanced stages, and such the formidable challenge to the surgeon who attempts its cure.

Clinically, carcinomata of the rectum and recto-sigmoid fall into three distinct types: (1) fungating; (2) annular; (3) colloid.

The fungating type is the one most commonly encountered in the rectum. It is felt as a hard nodular mass projecting into the lumen of the gut, or perhaps encircling it. If it is ulcerated, the base of the ulcer feels pultaceous, the edges hard and raised. Seen through the proctoscope, it is dark red in colour, in distinct contrast to the pale rectal mucosa or the pinker sigmoid mucosa. It is uneven in contour, and shelves off gradually into the surrounding normal surface. If ulcerated, it is covered by sloughing tissue, and it bleeds very readily on manipulation.

The annular type occurs more often in the recto-sigmoid region or upper rectum. It is felt as a firm constricting band which may or may not admit a finger, depending on the duration and the grade of the tumour. It tends to prolapse slightly into the lower rectum, and imparts to the examining finger a sensation not unlike that of a cervix uteri. It may be difficult to see through the proctoscope. Blood and perhaps mucus may be seen below it, and it may be evidenced only by a narrowing of the lumen which obstructs the passage of the instrument. Usually however one can see a dark red ring with nodular edges.

The colloid type represents the smallest group of rectal carcinomata. It is felt as a large mass, extremely bulky and friable, due to the production of mucin in the cells and its extension into the stroma. Pieces of gelatinous material often come away when the examining finger is withdrawn. Proctoscopy reveals an extensive breaking-down growth, which bleeds very readily on manipulation, and presents numerous semi-translucent nodules over its surface. These tumours are slow to metastasize but are difficult to eradicate because of their marked tendency to local invasion.

DIAGNOSIS

It is a truism that no disease can be diagnosed unless the possibility of its presence be kept in mind. The development of a cancer-consciousness in the mind of the physician is one of the greatest aids to the early recognition of this disease. Diagnosis, and particularly early diagnosis, is made by feeling and seeing the lesion, and is further established by biopsy. The history varies greatly, and for this reason one must carefully interrogate and examine every patient of cancer age who presents symptoms referable to the lower abdomen, bowel, rectum or anus. Even the most obvious case of hæmorrhoids should never be subjected to treatment until the examiner has satisfied his own mind by digital, sigmoidoscopic and x-ray examination, if necessary, that the patient's symptoms are not due to cancer.

Blood and mucus in the stools are the earliest and most constant signs of carcinoma of the bowel. Ninety per cent of our series of cases gave the passage of blood as the first indication. There may be increasing difficulty with the bowels, a history of taking more and more purgatives, lower abdominal cramps, the passage of small loose watery stools alternating with constipation, or rectal pain and tenesmus. The patient may have a loose bloody movement on rising, followed later by a more or less normal evacuation. Any of these complaints may occur in the history, or the patient may just have a vague uneasy feeling that something is wrong, without any specific symptoms. He may come complaining of "piles" which bleed or protrude, or the feeling that he is unable to empty the bowel completely. There may be general weakness, or loss of weight—but loss of weight is not an early feature of the disease.

The first evidence that anything is wrong may come with the development of large bowel obstruction, with increasing constipation, lower abdominal cramps, generalized distension and vomiting. This applies particularly to carcinoma of the recto-sigmoid. Carcinoma of the rectal ampulla may be quite far advanced before any signs of obstruction develop. In our series of 34 cases of recto-sigmoid carcinoma, 66.6 per cent were either obstructed or apparently approaching obstruction when first seen; in our series of 55 cases of rectal carcinoma

only 20 per cent were showing signs of obstruction when they came in for examination. It is significant that 92 per cent of the patients with obstructed rectal carcinoma were inoperable when they first presented themselves.

A complete physical examination should be made in every case, including digital, rectal and proctoscopic examinations. Enlarged glands in the groin should always direct one's attention to the anus and lower rectum. A mass in the lower abdomen calls for a rectal examination. Sigmoidoscopic examination should, if necessary, be repeated. If a good view is not obtained at the first attempt the patient should be given a dose of castor oil and instructed to report soon after the bowels have been thoroughly evacuated. Any case in which there is difficulty in getting the bowels cleared for examination should be regarded with suspicion, and an examination more painstaking even than usual carried out.

The clinical characteristics of the common malignant neoplasms have already been outlined. If benign polypi are present, one should remember that, according to Stout, 12 to 26 per cent of such patients will have a malignant lesion at some other point in the large bowel. Let us not be lulled into a false sense of security by assuming that the benign tumour is the cause of the symptoms, without first doing everything possible to eliminate the diagnosis of malignancy.

Biopsy.—Examination of a specimen of the tumour by the pathologist gives a great deal of accurate information, and this should be done in every case. First of all it determines definitely whether the tumour is innocent or malignant. Also it establishes the grade of malignancy. One's estimate of the best treatment to be advocated and the probable success of that treatment is influenced by the grade of the tumour. Grading is based on the degree of differentiation manifest in the cells of the tumour. The more closely the cells approach the normal structure, the lower the degree of malignancy. Regularity of the size and shape of the cells, formation of acini, production of secretion, and comparative absence of mitotic figures would place the tumour in grade 1. Extreme irregularity of the cells, both as to size and shape, absence of acinar formation, absence of secretion, and abundance of mitotic figures would place the tumour in grade 4. Characteristics between these two extremes would place the tumour in grade 2 or grade 3, depending upon the degree of differentiation.

Grade 1 tumours, if operable, have a good prognosis. Grade 3 or 4 tumours, even if operable, necessitate a bad prognosis, in view of the fact that early metastases will likely already have occurred. There is little risk of disseminating the growth by removal of the biopsy specimen, as no uninvolved tissue has to be incised. Moreover, the adjacent lymphatics are already choked with neoplastic cells and any cells liberated during the excision are not likely to progress very far.

X-ray examination.—A barium enema is not of much assistance in diagnosis. In rectal carcinoma it is unnecessary. In recto-sigmoid carcinoma overlying loops of bowel may obscure a small filling defect. A double contrast enema is of value in demonstrating lesions proximal to the recto-sigmoid.

Differential diagnosis.—The diagnosis of carcinoma in the terminal portion of the large bowel is best made by seeing and feeling the lesion. Any disease which produces a mass, an ulcer, or a stricture of the rectum, or is characterized by the passage of blood or mucus, must be considered in the differential diagnosis of carcinoma. Occasionally a tuberculous ulcer or granuloma resembles malignant disease. Tuberculosis of the large bowel is almost invariably secondary to respiratory disease. The demonstration of such disease would make clear the diagnosis of the rectal lesion. Strictures due to gonorrhœal proctitis may be mistaken for an annular growth.

Lymphopathia venerea (lymphogranuloma inguinale) is now being recognized more frequently. The rectal stricture, more common in females, is generally associated with induration extending out into the peri-rectal tissues. The inguinal lymph-nodes are enlarged and they may suppurate. Biopsy is negative for carcinoma and the Frei test is positive.

A chronic granuloma associated with amœbic infection may simulate a malignant tumour. The presence of multiple discrete ulcers, the prolonged history of diarrhœa, the possibility of exposure to the infection, and the immediate

therapeutic response to emetine hydrochloride will usually establish the diagnosis.

We have seen two cases of submucous adenomata which were proved to be benign only by biopsy and subsequent local excision of the whole tumour.

Endometriomata of the recto-sigmoid or recto-vaginal septum are sometimes difficult to distinguish from carcinomata.[11] The outstanding feature is a history of increased difficulty with the bowels during the menstrual period. The patient of course is a female. There is no rectal bleeding, no ulceration of the mucosa, and at laparotomy the tumour is found to be subserosal rather than submucosal. It does not tend to encircle the bowel, it is surrounded by numerous adhesions, and more than one tumour may be present.

The most difficult problem in differential diagnosis is presented by cases of diverticulitis involving the lower sigmoid. Usually the presence of diverticulitis is fairly easily demonstrable, but it has been shown by Spriggs and Marxner that in roughly 10 per cent of cases of diverticulitis of the colon carcinoma may also occur. Even if this figure be too high there are undoubtedly cases of diverticulitis with incipient obstruction of the colon, blood and mucus in the stools, and radiographic evidence suggesting carcinoma. In one of these cases (Fig. 3) the sigmoidoscope could not be inserted beyond the inflammatory mass, so that a view could not be obtained of the source of the bleeding. Even at laparotomy there were no criteria by which carcinoma could be definitely excluded. However, the advanced nature of the diverticulitis, the presence of a huge mass (Fig. 4) of inflammatory tissue with sinuses ramifying in the wall of the sigmoid and rectum necessitated as radical a procedure as if carcinoma had been present. It was not until the specimen was opened and examined from end to end that one could be sure no malignancy was present. Though this patient had been known to have diverticulitis for fourteen years he had been passing blood and pus with the stools for only a few months.

TREATMENT

Treatment, to be adequate, demands complete abdomino-perineal excision of the rectum and lower sigmoid colon. This dictum applies to both rectal and recto-sigmoid carcinomata. In a few rare early cases, where the growth is situated in the recto-sigmoid and is accessible, abdominal resection with end-to-end anastomosis may suffice. In our experience these cases are rare, *i.e.*, 4 in 34 cases. Another rare exception to the above dictum is the case with a malignant rectal polyp of low grade which can be dealt with by local excision or electrocautery. Three such cases have come under our observation.

The nature of the growth, its situation in the bowel, and the extent to which it has progressed are factors which subdivide the cases into three general groups: (1) those with complete obstruction; (2) those with partial obstruction; (3) those with no obstruction.

In any patient with intestinal obstruction, from any cause whatsoever, the prime requisite in treatment is the relief of that obstruction. Complete obstruction is an emergency. Accumulated toxic intestinal products must be drained, peristalsis encouraged, the general systemic manifestations of intestinal toxæmia overcome.

Cæcostomy is of chief value with patients *in extremis*, whose condition makes even the minimum of surgical interference a grave undertaking. It is only partly effective; it cannot completely empty the large bowel, nor can it prevent the periodic influx of small bowel contents into the colon. It is effective in tiding the patient over until his condition warrants the establishment of more effective drainage later on.

Under local anæsthesia a muscle-splitting incision is made. The cæcum is exposed, the surrounding structures packed off, a purse-string is introduced; and a tube is inserted into the bowel lumen. This procedure may be facilitated by first evacuating the cæcal contents and gas by means of a trocar and cannula attached to a suction apparatus. The peritoneum and muscles are closed, and irrigations can begin in a few hours' time. Any attempt at further exploration is contraindicated. In the course of a few days the inflammatory reaction at the site of the obstruction gradually recedes, and it often becomes possible to irrigate the colon through the rectum and past the obstruction. When the condition of the patient has improved sufficiently one may then proceed with whatever investigation is necessary to determine the location and the characteristics of the obstructing lesion. If these measures have been successful in relieving the

complete obstruction the patient enters the second, or partially obstructed, class.

Partially obstructed cases of rectal carcinoma present a less acute problem. In many colon cases the use of glucose drinks and mineral oil by mouth, together with repeated irrigation of the large bowel per rectum, may succeed in gradually evacuating the toxic contents of the distended colon. When this is accomplished the inflammatory œdema at the site of the tumour gradually subsides, and thus the imminent danger of a complete obstruction may be averted. The patient can then be thoroughly examined, and prepared for more deliberate and, therefore, safer surgical measures. Those patients in whom a cæcostomy for complete obstruction or conservative treatment for partial obstruction has failed to bring about sufficient improvement to warrant a one-stage operation must be advised to have a permanent inguinal colostomy. This will act as a preliminary to abdomino-perineal resection in the operable cases, or as palliative treatment in the inoperable ones.

A left-sided muscle-splitting incision is made, a free loop of the upper sigmoid is drawn up to the surface, an opening made in the meso-sigmoid, and a stiff rubber tube passed through this to prevent the bowel slipping back into the abdominal cavity. The peritoneum is closed around the bowel, but *no sutures enter the bowel wall.* The muscular layers are next brought loosely together, and a piece of gauze is placed beside the bowel down to the peritoneum. Immediate drainage of the bowel is rarely necessary. In order to facilitate subsequent opening of the bowel a double fold of its wall is grasped and crushed in curved forceps and allowed to remain for 24 to 48 hours, depending upon the degree of distension and toxæmia. After this interval the peritoneal cavity will not be contaminated when the bowel is opened. The placing of the curved forceps is an important detail. The area crushed should be in the descending arm of the colostomy (Fig. 9), so as to leave a longer loop for the colostomy opening.

Rehabilitation of the patient is accomplished by colonic irrigations, laxatives, and a liberal diet. His general health must then be built up in order to strengthen him for the ordeal of the major abdomino-perineal operation. The possibility of metastases occurring in the intervening weeks is more than offset by the reduction in operative mortality brought about by thorough pre-operative preparation. Once the obstruction is relieved and the colostomy functioning well, it is advisable to carry out

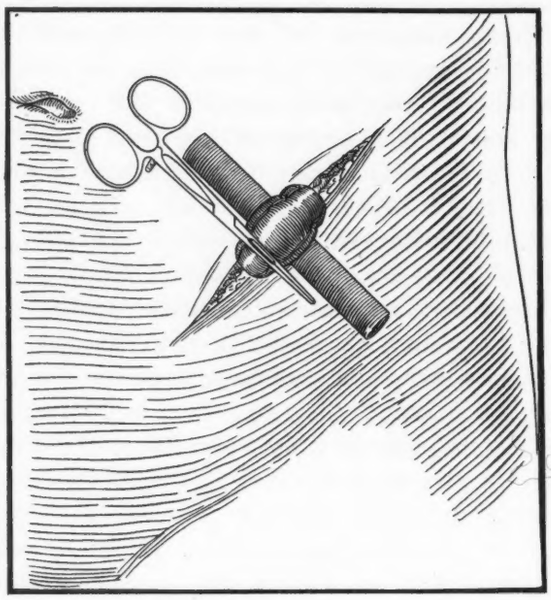

Fig. 9

daily lavage of the rectum. This helps greatly to reduce the amount of inflammation in and around the tumour, and thus lessen the risk of post-operative infection.

Once the problem of complete or partial obstruction has been solved either by cæcostomy, inguinal colostomy, conservative treatment, or a combination of these, depending upon the individual case, the patient can be considered to be in the third group namely—those without obstruction. The problem now resolves itself into a consideration of those surgical methods available for the adequate removal of the malignant lesion.

Operability.—One must first decide whether or not the growth is operable. The figures available on the operability of carcinoma of the rectum and recto-sigmoid vary considerably, ranging from 19.3 per cent in the hands of Boas, to 80 per cent in the hands of Bergman. Miles' estimate of operability is 29.3 per cent. In our series of 89 cases 49 per cent were operable.

There are two main factors that influence the operability of a growth, and the two are inter-dependent: (1) the patient's general condition, and (2) the extent and the nature of the local lesion. Old age, myocardial

disease, hypertension, renal disease, diabetes, and chronic respiratory diseases are serious complicating conditions, and, if advanced, may make the operative risk prohibitive. Whether or not these should be considered contraindications will therefore depend to some extent upon the degree to which they have progressed and whether the carcinoma is early or late, readily accessible or relatively inaccessible. If the growth itself is borderline or advanced the complicating conditions should be considered contraindications to operation.

As far as the local lesion is concerned the most important single factor in deciding its operability is the approximate length of time it has been present. This places a grave responsibility upon the physician who first sees the patient, for only by early accurate diagnosis and immediate treatment can we hope to lower the death rate from carcinoma of the rectum or recto-sigmoid. The extent of the growth and its fixity to surrounding structures are the main indications of its duration. A fixed tumour may or may not be inoperable. If it remains fixed after a colostomy and a period of irrigations sufficient to reduce the perirectal inflammation it is definitely inoperable. A tumour invading the bladder, seminal vesicles, prostate or urethra, is inoperable. A tumour attached to the uterus may, however, be operable if a hysterectomy can be done with the abdomino-perineal excision. The presence of secondary lesions in the glands of the groin or pre-aortic region, makes a tumour inoperable. Deposits on the parietal or visceral peritoneum are contraindications to operation unless closely adjacent to the tumour. Even then, their presence adds greatly to the gravity of the ultimate prognosis. Deposits in the liver may not be a contraindication to operation in a slow-growing tumour, but the operation then has only a palliative value.

Preliminary treatment.—Once the decision has been made that the tumour is operable certain preliminary measures are necessary. Briefly, they are as follows: (1) relief of obstruction, as outlined previously; (2) a highly nourishing pre-operative dietary regimen; (3) control of associated medical conditions; (4) free daily evacuation of the bowel by the use of mineral oil and a sufficient dose of mild laxative, combined with colonic irrigation; (5) diminishing colonic residue and lessening its toxicity by a few days pre-operative low residue non-protein diet; (6) blood transfusion in all enfeebled patients, even if there is only a slight degree of anæmia; (7) peritoneal vaccination. This should be done before the second stage if the two-stage operation is decided upon. We feel vaccination is of definite value in preventing post-operative peritonitis.

Mickulicz first experimented with intraperitoneal vaccination many years ago. More recently Rankin and Bargen[5] have contributed work which places peritoneal immunization on a sound basis. In 1931 they reported two groups of cases in which major colonic and rectal operations were done. In the vaccinated group of 222 cases the post-operative mortality from peritonitis was 4.9 per cent. In the smaller unvaccinated group (58 in number) the mortality from peritonitis was 22.5 per cent. The two groups differ greatly in number, and other factors with reference to risk may not have been strictly comparable. Nevertheless, one must admit that the difference of mortality in the two groups is striking. (See also Goldblatt and Steinberg.[6])

Rankin and Bargen use a specially prepared vaccine containing streptococci and *B. coli.* We have been using triple typhoid vaccine. It is probable that the essential mechanism in the production of immunity is the increase in number of the defensive cells in the peritoneal fluid.

Ninety-six hours before operation a test dose of 25 million typhoid bacilli is given intramuscularly. If no untoward reaction occurs the intra-peritoneal vaccination is done the following morning. A spot in the abdominal wall remote from operative scars is chosen in order to avoid puncturing adherent loops of bowel. The left upper quadrant seems a favourable site as the underlying thick-walled stomach is not likely to be pierced by the needle. The tissues are anæsthetized by novocaine down to the peritoneal layer. A lumbar puncture needle is then pushed through into the peritoneal cavity, the stylus is withdrawn, and a syringe containing 500 to 750 million typhoid bacilli in 10 c.c. of normal saline is fitted to the needle. The vaccine is slowly introduced into the peritoneal cavity. A little

abdominal pain, some nausea, and a pyrexia of 99 to 101° F. for a day or so after the injection are usually the only discomforts the patient experiences. In a recent article Rankin asserts that he has discontinued this pre-operative measure. We feel, however, that the evidence in favour of this procedure is so strong as to justify a continuance of its use. It probably constitutes an additional factor of safety.

SURGICAL TREATMENT

The operative procedures available in carcinoma of the rectum and recto-sigmoid are: (1) abdomino-perineal excision, one-stage or two-stage; (2) perineal excision; (3) electro-coagulation. The first is the operation of choice in the large majority of cases. The second or third is reserved for early carcinomata in the lower third of the rectum or the anal canal, and for cases complicated by old age, myocardial disease, diabetes, cardiovascular and renal disease, or any other factor which makes the risk of the more radical procedure too great.

Various technical modifications of the standard abdomino-perineal operation are described by Miles,[1] Coffey,[7] Jones,[8] Lahey,[9] Rankin,[2] etc., but the essential principle of them all is the same, *viz.*, removal of the entire anus, rectum, ischio-rectal fat, levatores ani, retro-rectal tissues, meso-sigmoid, and the lower sigmoid colon. As can be seen in the section on pathology, nothing short of this will succeed in removing all of the structures that may conceivably be involved in the extension of the growth.

Abdomino-perineal operation. — One should elect the two-stage operation in all obstructed cases and in all cases deemed poor operative risks, for the reasons already outlined. In relatively young individuals with uncomplicated early carcinoma of the rectum proper, who are considered good operative risks, one is justified in using the one-stage procedure (Fig. 5), provided that adequate cleansing of the colon has been attained and that intraperitoneal vaccination has been carried out.

A paramedian incision is used and the abdomen is explored. The infected tumour should be the last to be palpated. For the colostomy a loop of upper sigmoid is chosen which will come to the skin surface without tension, yet not be loose enough to prolapse. A blunt instrument is pushed through the meso-sigmoid near the bowel, and the opening is extended two or three inches. A two-inch incision is next made through the abdominal wall in the left iliac region and two inches above and medial to the anterior superior spine of the ilium. A crushing forceps is passed through this and its jaws made to grasp the sigmoid at the site chosen for colostomy. A second clamp is applied just below this, through the paramedian incision. The bowel is divided by cautery, and the upper end of the loop is drawn to the surface through the smaller wound. The peritoneum is closed around this. No sutures are placed in the bowel wall as they may cause an annoying fistula at the edge of the colostomy. A small gauze strip is placed alongside the bowel down to the peritoneum and the muscles, and the aponeurosis and skin are drawn together loosely by sutures. The small space left between the upper loop and the left abdominal wall forms a potential opening for small bowel herniation, and therefore should be obliterated by the use of a purse-string suture.

Attention is next directed to the end of the lower loop. Two methods are available. The first is to purse-string and invert the end, and then drop it back into the abdomen (Fig. 6). In the presence of obstruction, even if incomplete, some residue of colonic contents may stagnate in this loop in spite of careful irrigation. Then again, the adhesions that inevitably form between this blind end and the surrounding structures add considerably to the difficulties in locating and freeing it at the second operation. In view of these objections, the second method, advocated by Lahey (Figs. 7 and 8), is probably the more satisfactory. The end, still grasped in the forceps, is brought out through the lower end of the paramedian incision, and the wound closed around it as carefully as that around the colostomy. The forceps can be left on for several days or until the wound is completely healed. The two incisions should be carefully isolated by means of oiled silk fixed to the skin by adhesive. This minimizes the chance of infection spreading from the colostomy to the paramedian incision. A dressing of Compound Tincture of Benzoin under the oiled silk gives still further protection to the wound.

This completes the first stage. An interval of from three to six weeks is usually required between the first and second stages, depending upon the patient's response to treatment. His progress will depend to a great extent upon the thoroughness of his surgical and medical management in the intervening weeks. His fluid balance must be maintained immediately following the operation by the use of glucose and saline solutions by mouth or by the intravenous route. Twenty-four to seventy-two hours after operation the clamp can be removed from the colostomy. We usually insert a rectal tube into the opening and secure it by means of a silk purse-string suture passed around the protruding knob of bowel. This protects against retraction, lessens the risk of contaminating the paramedian incision, and keeps the patient clean. The bowel contents drain off into a bottle, and the tube is kept patent by running in water two or three times a day. As soon as the patient desires food, a low-residue diet is begun, and is gradually increased until he is getting an adequate quantity of nourishing food to build up his general health to the best possible state.

It is of paramount importance to bring about a reduction of the infection around the tumour. To this end repeated irrigations of the lower loop of bowel with normal saline are carried out. If the Lahey procedure is used irrigations can start on the fourth or fifth day. If a blind end has been left in the abdomen it would be wise to wait until the end is well sealed—about a week, before instituting rectal irrigation. Digital rectal examinations are made occasionally to make sure the rectum is being emptied. In ten days the patient is allowed out of bed and encouraged to increase his exercise daily until the time for the second operation arrives. Intraperitoneal vaccination is administered during this interval.

Second-stage operation.—Cyclopropane gas, intra-tracheal ether, or spinal anæsthesia are used. If the Lahey operation has been done the opening in the lower sigmoid must first be sewn over extra-peritoneally and thoroughly sterilized, and the whole operative field again painted with iodine. Gloves, drapes and instruments are changed, and the laparotomy is begun. Adhesions are separated and the sigmoid is exposed. If the blind end has been left in the abdomen this is located and dissected free. Next the inferior mesenteric vessels are identified. An opening is made in the posterior parietal peritoneum, the left ureter is exposed and retracted, and the inferior mesenteric vessels are freed close up to their origin but below the origin of the left colic artery. They are then doubly clamped and divided, and both ends are ligatured. A curved incision is made in the posterior peritoneum on both sides of the meso-sigmoid, extending downwards and forward into the pelvis toward the cervix in the female and the bladder in the male. An inch or more of normal peritoneum should be removed on either side of the tumour. The operator's hand is now passed down behind the meso-sigmoid, stripping the whole mass of fat, bowel and tumour from the hollow of the sacrum and the side wall of the pelvis. As the floor of the pelvis is reached, firm bands of tissue are encountered on either side, containing the middle hæmorrhoidal vessels. These are clamped and divided. Further blunt dissection frees the rectum from the bladder, seminal vesicles and prostate in the male, or from the vagina in the female. The sigmoid and rectum having been thus freed down to the pelvic floor, they are pushed down into the pelvis and the peritoneum is closed over them to form a new pelvic floor. In the female the uterus can be used to help fill in the gap left by the removal of the peritoneum.

The abdominal wound is now closed, and the patient is turned over into the prone position. The table is adjusted so as to flex the hips to an angle of 110 degrees. A silk purse string is made to encircle the anal opening, and is tied securely. An incision is made in the midline, and is extended from the lower sacral region forward to encircle the anus. The coccyx is removed. The posterior fascia is divided and the rectum is pushed forward away from the sacrum. At this point the middle sacral artery is divided and ligatured. Next, the coccygeus and levator ani muscles are hooked with the finger on either side, and divided as near to their origin as possible. As the incision is carried forward through these muscles and through the ischio-rectal fat the terminal branches of the inferior hæmorrhoidal vessels are located, clamped, divided and ligatured. Further blunt dissection frees the rectum from the sacrum and the side walls of the pelvis.

The rectum having been freed posteriorly and laterally, the dissection is now carried out anteriorly, proceeding from the anus upward behind the vagina in the female, or the bulb of the urethra in the male. In the latter, the recto-urethral muscle must be severed.

Following removal of the rectum all bleeding points in the cavity thus formed are ligated and the walls of the cavity lined by oiled silk. Two pieces, six by eight inches, are used, one placed anteriorly, the other posteriorly. Dry gauze is lightly packed between them, and the skin edges are approximated around them by silk-worm sutures. The gauze is withdrawn on the third or fourth day, the oiled silk left in a day or two longer. Thereafter, the cavity is irrigated daily with Dakin's solution, and a small wick is placed between the skin edges to facilitate drainage. Some infection of the large cavity is bound to take place, but it seldom causes any serious trouble.

In the immediate post-operative stage the patient may require blood transfusions or the intravenous administration of gum acacia or saline for shock. The latter may be continued for two or three days as a supplement to the oral intake of food and fluids. If there is difficulty in voiding it is better not to carry out repeated catheterizations in such close proximity to a more or less infected wound. An indwelling catheter is more satisfactory, but should be changed every four or five days. Colonic irrigations and mild laxatives are used as indicated. Medical complications such as atelectasis, bronchial infections, myocardial failure are watched for and treated if they arise. Occasionally the paramedian wound becomes infected. This must be kept in mind if any unexplained rise of temperature occurs or persists. The wound may even appear normal on the surface, yet have some deep-seated sub-aponeurotic infection. A month's hospitalization is usually necessary following the second stage of an abdomino-perineal operation. It usually takes about two months for the posterior wound to heal completely.

Statistics on the mortality rates for this operation vary somewhat. Miles' operative mortality was 9.4 per cent; Jones' 22.7 per cent and Coffey's 15 per cent. In our series of 44 cases (which represent 49 per cent of all the cases of rectal and recto-sigmoid carcinomata seen by us from 1925 to 1936) the operative mortality was 11.3 per cent. This does not include the ten cases treated by electro-coagulation. There were five post-operative deaths. The causes of death were as follows: 1 case—aged 59, myocardial failure after preliminary colostomy; 1 case—intestinal obstruction, herniation of small bowel around the colostomy; 3 cases—general peritonitis (none of these had had pre-operative intra-peritoneal vaccination).

Perineal excision of the rectum.—An essential preliminary to perineal excision is the previous establishment of a permanent colostomy with the upper and lower openings far enough apart to prevent leakage of bowel contents from the upper sigmoid into the blind lower loop which will of necessity be left. A detailed discussion of the operative technique is not required, as it has already been described in connection with the abdomino-perineal operation. The only difference is that the lower loop of sigmoid has to be severed and left. The end of this loop must be carefully turned in so as to avoid an annoying mucous fistula in the perineum.

ELECTRO-COAGULATION OF RECTAL AND RECTO-SIGMOID CARCINOMATA

In a selected group of cases excellent palliative results have been obtained by means of electro-coagulation. Strauss, of Chicago,[10] has reported a series of very satisfactory cases treated by this means, many without colostomy. Ten of our cases have been considered suitable for this method of treatment; only one of them had a preliminary colostomy. The others have been saved a colostomy and are well over periods varying from two and a half years to two months. The earliest of these cases was a debilitated woman with a marked secondary anæmia and an advanced adeno-carcinoma of the cauliflower type which had penetrated the recto-vaginal septum and was fungating into the vagina. This patient is still alive and free from disease.

The indications for this method of treatment are as follows: (1) advanced age (one of our cases is 83 years old); (2) marked general debility from myocardial disease, nephritis, chronic pulmonary sepsis, diabetes, etc.; (3) tumours of the rectal ampulla, especially if situated posteriorly and laterally, *i.e.*, not contiguous to the bladder, prostate or urethra; (4) where colostomy and radical surgery are refused by the patient.

The technique we have used in electro-coagulation is similar to that employed by Strauss *et al.*[10] Under spinal anæsthesia the tumour is exposed through a bakelite proctoscope, and coagulation carried out by means of a circular electrode on an insulated carrier. By this method short-circuiting and cross-sparking are avoided. The smoke produced during coagulation is kept cleared away by suction. The tumour is progressively coagulated until soft tissue is reached, great care being taken to avoid perforation into the peritoneal cavity or adjacent viscera, *i.e.*, the bladder, urethra or ureters. It is generally necessary, especially if the case is at all advanced, to treat the patient in stages, giving two, three or four treatments at intervals of two or three weeks until the tumour has been completely destroyed. In this way the risk of doing undue damage to normal structures is minimized.

Post-operative reactions are minimal, usually consisting of a few days' pyrexia, and an occasional slight hæmorrhage, controllable by medical measures and by packing. One of our cases required a transfusion. We have had no mortality from this procedure, notwithstanding its use in bad-risk patients. If the tumour has been at all extensive a post-operative stricture always occurs. Usually it can be kept dilated, but a local resection, or even a colostomy may be required if the scar tissue is too abundant. Whether its value is more than palliative we are not prepared to state definitely. Strauss reports excellent long-term cures extending from three to eight years, and believes that the electro-coagulation and consequent phagocytic response locally causes in some way a destruction of existing glandular metastases. The possibility of such distant control of metastases has not been demonstrated with other forms of carcinoma treated by electro-coagulation, *i.e.*, of the tongue, etc., and is still open to question.

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SUDDEN DEATH IN INFANCY*

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IN discussing the causes of sudden death in young infants it is still necessary to begin with a discussion of the rôle of the thymus and the condition known as status thymicolymphaticus in these occasional catastrophies. From the time that the thymus was first suggested as a cause there have been endless denials and affirmations. As early as 1845 Friedleben[1] denied the rôle of the thymus in the causation. The controversy, however, has continued up to the present day, and in 1932 Boyd[2] spoke of the "tenacious misconception that respiratory difficulty and disposition to sudden death are associated with status thymicolymphaticus." A special committee of the Medical Research Council and the Pathological Society of Great Britain and Ireland concluded in its report[3] that "the facts elicited afford no evidence that so-called status thymicolymphaticus has any existence as a pathological entity". Paltauf,[4] in 1889 and 1890, first spoke of the "lymphatic constitution". At that time pressure on the trachea from an enlarged thymus was considered the immediate cause of respiratory difficulty and sudden death. Czerny used to demonstrate

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Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Pædiatrics, June 24, 1937.

cross sections of a whole infant, taken at various thoracic levels, in order to show how little the thymus lies in relation to the trachea and great vessels and how the bulk of the thymus overlies the pericardium, and thus is through its entire extent almost wholly in relation to the heart (Fig. 1). A glance at such a section would convince one that the ordinary thymus could not possibly compress the trachea. Only in rare instances when there are processes going up into the episternal notch does the thymus come into any relationship to the trachea at all. Mitchell and Brown[5] concluded that their study on status thymicolymphaticus furnished no solution to the question of the relationship of sudden death not explicable by some discoverable cause to status thymicolymphaticus. Moreover, a careful study of young infants with respiratory difficulty, whatever the roentgen picture of the thymus will be, will invariably demonstrate the cause of the dyspnœa to be something remote from the thymus. Such conditions as pulmonary atelectasis, micrognathia, nasal obstruction from syphilis or adenoids, and prominent cervical bodies in the throats of mentally defective children have all at some time or other been miscalled "thymic asthma".

With the development of the ideas concerning glands of internal secretion the thymus was then considered such a gland though the nature of its secretion was unknown. As late as 1920 Symmers[6] elaborated what may now be regarded as a fantastic theory. He believed that the most frequent cause of death was in the nature of an anaphylactic reaction due to the sensitization of the body by a specific nucleoprotein formed in the lymph nodes as the result of necrosis of numbers of germinal follicles. Then, too, with the coming of x-rays, it became the fashion to take roentgenograms of infants and make a diagnosis of thymic enlargement. It can truthfully be said that no phase of roentgenology has been subject to a greater divergence of opinion as to what was and what was not a thymus, and as to what was and what was not normal. It was Gerstenberger[7] who demonstrated at the time when belief in thymic shadows and thymic death was at its height, that a "thymic shadow" could be shown either absent or present in the same infant in exposures made within a few seconds of each other, the whole depending upon the phase of respiration during which the exposure was made. Irradiation for enlarged thymus became for a time a fashion until it was observed that where there was respiratory distress the respiratory distress remained unchanged, and that here and there, in spite of irradiation, in spite of alleged cure of the diseased thymus sudden death nevertheless ensued. More recently too, Rowntree *et al.*[8] have been able to show that extirpation of the thymus in rats, while it had no apparent ill effect on the animal itself, had a profound effect on the succeeding generations, causing dwarfism in succeeding litters. On the other hand, administration of thymic extract accelerated growth, development, maturity and fertility. Moreover in a study which he and his collaborators made on a large group of children who had been irradiated for so-called enlarged thymus he found that the percentage of idiots in that group was far larger than in any other group of children, and he asked the question if he were merely irradiating children who were mentally defective or if the irradiation itself produced a more profound effect upon the development of the child than we have hitherto realized? In any event such a question should give us pause before we further proceed with the indiscriminate irradiation of every new-born infant who snuffles, grunts, wheezes, has convulsions or cyanotic attacks. Immediately after Paltauf's work in 1889 Hammar's[9] work appeared. This is or should be well known to anyone interested in the question of the thymus. Briefly, he showed that the size of the thymus was large in any healthy well nourished child and that it was small in any suffering from any acute or chronic illness. He showed that persons killed accidentally had thymus glands as large as persons dying suddenly, and concluded that the thymus glands in children dying after prolonged illness were involuted, and that the normal thymus was the large thymus of the healthy person.

Boyd[2] in an extensive study of the same subject has amply confirmed the original work of Hammar. She says that, whatever the cause of death, "the weight of the thymus decreases with the length of the illness," and that involution begins by the second day of any illness. She concluded that "the concept of a pathological state arose from misconstruing the

Fig. 1.—Photograph of the normal thymus in the newborn. Note the extent to which it overlies the pericardium. **Fig. 2a.**—Photomicrograph of normal thymus. Note the fine trabeculæ and the width of the cortex (dark due to numerous lymphocytes) as compared to the narrow medulla (pale due to reticulum cells and Hassall's corpuscles). **Fig. 2b.**—Photomicrograph of the atrophic thymus of "accidental involution". This term refers to the atrophy associated with illness or malnutrition as opposed to the natural involution of age. Note the wide trabeculæ and absence of lymphocytes. The parenchyma consists mostly of reticulum cells and hypertrophied Hassall's corpuscles. **Fig. 3a.**—Photomicrograph of normal lung alveoli. **Fig. 3b.**—Photomicrograph of lung alveoli in interstitial pneumonia. The alveoli walls are thickened, congested and contain inflammatory cells. **Fig. 3c.**—Peribronchitis involving a medium sized bronchus. The wall is infiltrated with a moderate number of lymphocytes. **Fig. 4a.**—Photomicrograph of normal island of Langerhans of pancreas. (Pale, round area in centre of picture). **Fig. 4b.**—Photomicrograph of hypertrophied island of Langerhans. (A-36-36).

normal prominent thymus and lymphoid tissue for a constitutional abnormality, and, vice versa, the involuted, inconspicuous thymus of inanition being misconstrued for the normal''. (Fig. 2a and Fig. 2b). If this is true, it is evident that no idea of the size of the thymus gland can be obtained unless the patient has died suddenly, for the gland undergoes rapid involution during starvation, infection, or illness of any kind, and what we have been regarding as a pathological entity under the name of status thymicolymphaticus is only an expression of the normal state of the lymphatic system in the well nourished actively growing child. In the matter of the thymus we are faced with this important fact, namely, that in spite of repeated affirmations no proof has ever been brought forward that it is the cause of sudden death in infants. We are faced also with the necessity of revising our meagre knowledge of this subject and of searching more thoroughly for the cause or causes of sudden death in infants. The work of Waldbott[10] and Anthony was a step in that direction. They pointed out that there is a very strong relationship to anaphylactic shock in most cases of so-called thymic death. They showed that a majority of cases which they studied gave a history of one or other manifestations of the allergic state. This is not a new idea because all students of pædiatrics even a generation ago were taught that the infant with eczema was more liable to sudden death than any other child. Waldbott and Anthony's work is a step in the right direction. It is probably not the whole truth. We feel that a more thorough search and more complete post-mortem examinations will reveal not one but a multiplicity of causes of sudden death.

F. Saint Girons,[11] in his report of the Sixth French Pædiatric Conference in 1929, quotes Nobécourt and Boulanger-Pilet[12] as listing the following groups of causes of sudden death in infants. (1) Failure or malfunction of an organ; either circulatory failure, a latent broncho-pneumonia, kidney or digestive tract, meningeal hæmorrhage, retropharyngeal abscess, or endocrinopathy. (2) Acute infection, such as typhoid, atypical diphtheria, scarlet fever, whooping cough or congenital syphilis. (3) Eczema. (4) The thymus which can according to them under certain circumstances cause pressure. (They refer, however, to Apert who denies the possibility of the thymus causing sudden death and because of the rapid changes in the size of the thymus has called it the ''accordion organ''.) (5) Spasmophilia, with spasm of the glottis and cardiac failure. (6) An unclassified group which has been assembled under the sobriquet ''sudden death diathesis''.

Our cases at the Children's Memorial Hospital in Montreal fall into two main groups: those suffering a very short though violent illness, and those apparently not ill at all, usually infants found dead in bed.

The following series of cases was selected from the autopsy records of the Children's Memorial Hospital of Montreal, in an attempt to illustrate the foregoing arguments and to make a comparison of thymic weights in cases of sudden death, particularly where a definite factor could be demonstrated. This comprises only 30 cases, as a large number had to be thrown out because of lack of detail, and all deaths associated with anæsthesia have been excluded. A number of the cases used have not been as completely investigated as we would do them at the present time. Nevertheless, they serve to illustrate the point in question.

The standard normal weights which have been used are those of the Status Lymphaticus Committee of the Medical Research Council, as reported by Young and Turnbull.[3] Whenever necessary we have used their methods of calculating the expected weight of the thymus from the age, body-weight, stature, and weight of the heart. Both Bratton and Hammar (quoted by Young and Turnbull[3]) emphasized the importance of considering the relation of the weight of the thymus to that of the body.

The cases have been divided into four groups, each of which will be taken up separately. It is to be noted here that the majority of these patients showed little or no gross changes in the organs.

1. *Obvious infection with death less than 24 hours of onset.*—(Table I).

Six cases were included in this group. In all but one of these (A-35-82) the symptoms and signs developed twelve to twenty-four hours before death. The exception was a well baby who one week before death developed

what was considered to be mild pertussis. On the day of his death he seemed well, had one degree of fever, suddenly developed convulsions, and died in 18 hours. Because of the acute onset of the symptoms and the weight of the thymus it has been placed in this group.

Three infants were under one year of age, in which period the average thymic weight is 26 g., with a standard deviation of 10.9 g. The weights were 24 g., 38 g., and 40 g., respectively. Thus one was normal and two were 1 and 3 g., respectively, above the maximum weight, an excess which is obviously of little significance, particularly as only ordinary precautions were taken for removing extraneous tissue from the thymus before weighing. Three infants were over one year of age. The normal average weight for the thymus in the age-period one to six years is 23.4 g. with a standard deviation of 9.6 g. The weights in these children were 25, 17 and 32 g.—all within the above noted normal range. It will immediately be seen that these weights are greatly in excess of the average autopsy thymus, which usually varies from 3 to 8 g.

Yet from the histological viewpoint definite inflammatory lesions in various organs were present in all cases. Four showed peribronchitis and interstitial or alveolar pneumonia. One case is of interest in this group as it showed the value of extensive histological and routine bacteriological studies at autopsy. This child vomited, became feverish, and was mildly ill for twelve hours. In the next few hours he rapidly became worse and died within twenty-four hours of onset. Gross autopsy (A-35-17) was negative except for a slight hydroperitoneum. Culture of the peritoneal fluid and the heart's blood yielded a pure growth of hæmolytic streptococci. Sections showed an interstitial pneumonia. This child died of a fulminating streptococcal septicæmia and yet his thymus weighed 38 g. As pointed out by Farber,[13] this type of streptococcal infection may show nothing more than a mild peribronchitis and interstitial pneumonia (Fig. 3a, Fig. 3b, and Fig. 3c). The patients die in 18 to 48 hours with a bizarre symptomatology. Another child (A-36-48) in this group of four, died from an acute laryngo-tracheo-bronchitis due to a hæmolytic streptococcus. The infection was so fulminating that death occurred within 20 hours of onset.

The fifth case (A-34-22) had a definite interstitial pneumonia and petechial hæmorrhages in the thymus, pleura and pericardium, but as sections of the trachea and the larger bronchi were not taken, the supporting evidence is absent. One can only say that in view of the clinical history, these lesions suggest infection. The sixth patient (A-34-56) had a history of a fulminating intestinal infection with diarrhœa,

TABLE I.

OBVIOUS INFECTION WITH DEATH WITHIN LESS THAN 24 HOURS OF ONSET

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–34–22 10 weeks Male	24 g. Normal 26 ± 11 g.	Irritable several nights. Developed convulsions and died in 12 hours.	Interstitial pneumonia. Petechial hæmorrhages in thymus, pleura and pericardium.
A–34–56 2 years Male	17 g. Normal 23 ± 10 g.	Chills, fever, loose stools, leukopenia. Temperature 104°. Died in 24 hours.	Inflammatory infiltration of colon but no ulcers. Bacteriology negative.
A–36–48 14 months Female	32 g. Normal 23 ± 10 g.	Difficulty in breathing. Temperature 102°. Pus in trachea. Died in 20 hours.	Acute laryngo-tracheo-bronchitis. Early broncho-pneumonia. Organism—hæmolytic streptococcus.
A–35–82 5 months Male	40 g. Normal 26 ± 11 g.	Mild pertussis? one week. Temperature 99°. Suddenly developed convulsions and died in 18 hours.	Marked peribronchitis and interstitial pneumonia.
A–35–17 12 months Male	38 g. Normal 26 ± 11 g.	Vomited. Temperature 100.2°. Twelve hours later temperature 103°. No physical findings. Died in 24 hours.	Interstitial pneumonia. Pure culture hæmolytic streptococcus from heart's blood and peritoneal fluid.
A–35–97 17 months Male	25 g. Normal 23 ± 10 g.	Fever first noted. Developed convulsions and died in 24 hours.	Interstitial and alveolar pneumonia. Right otitis media.

TABLE II.

OBVIOUS INFECTION WITH DEATH WITHIN 1 TO 5 DAYS OF ONSET

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–32–37 10 months Female	28 g. Normal 26 ± 11 g.	Convulsions off and on for two days. Temperature 103°. Clinically, tetany. Died suddenly 16 hours after admission.	Markedly hyperplastic parathyroids. Slight interstitial pneumonia and marked congestion of lungs. Died from laryngeal spasm?
A–35–84 10 months Female	21 g. Normal 26 ± 11 g.	Stridor; periodic attacks of cyanosis. Two days before death developed an upper respiratory infection with temperature 105°. Marked evidences of tracheal obstruction before death.	No lung changes. Congenital hæmangioma of the trachea. Early scurvy.
A–37–23 5 months Male	13 g. Normal 26 ± 11 g.	Fever, dyspnœa and constipation two days. Convulsions one day. Temperature 108°.	Interstitial pneumonia. Petechial hæmorrhages in thymus, pleura and mesentery. Scurvy.
A–35–64 2 years Male	13 g. Normal 26 ± 11 g.	Anorexia and pallor since birth. Refused food for 36 hours but did not seem ill. Temperature 102°. Nutritional anæmia. Died suddenly.	Acute appendicitis and peritonitis.
A–35–24 3 months Male	21 g. Normal 26 ± 11 g.	Developed a cold followed by convulsions. Had rickets and tetany. Died while being fed.	Broncho-pneumonia. Larynx and trachea blocked by aspirated milk.
A–34–17 8 months Female	38 g. Normal 26 ± 11 g.	Three days before death, became restless, had difficulty in breathing with stridor. Developed cyanosis and died.	Laryngo-tracheo-bronchitis. Early broncho-pneumonia.
A–36–53 15 months Female	20 g. Normal 23 ± 10 g.	Apparently had a cold for 10 days but did not seem ill; 36 hours before death, developed convulsions. Temperature 102°.	Alveolar and interstitial pneumonia. Peribronchitis. Left mastoiditis. Slight cellular infiltration of meninges.
A–36–36 6 months Male	17 g. Normal 26 ± 11 g.	Pneumonia three weeks previously. Doing well until it died very suddenly during the night.	Healing pneumonia. Pericardial and pleural petechiæ. Remarkable localized hyperplasia of islets of Langerhans.
A–35–12 3 months	17 g. Normal 26 ± 11 g.	Developed a cold. Slight fever which rose to 104°. Negative physical and x-ray of chest.	Marked interstitial pneumonia.

TABLE III.

SUDDEN DEATH WITH ATROPHIC THYMUS

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–35–49 6 months Female	7 g. Normal 26 ± 11 g.	Had been in hospital with intestinal intoxication. Discharged well and died suddenly at home 3 weeks later.	Alveolar pneumonia. Left otitis media.
A–36–24 3½ months Male	7.5 g. Normal 26 ± 11 g.	Treated for 10 days for furuncles of scalp. Died suddenly at home.	Atrophy of thymus. Mild tracheobronchitis and interstitial pneumonia with petechial hæmorrhages.
A–36–4 6 weeks Female	5.5 g. Normal 26 ± 11 g.	Pyloric stenosis. Operated successfully. Died suddenly 2 days later.	Patchy interstitial pneumonia with petechial lung hæmorrhages. Marasmic infant.
A–37–2 6 months Male	6 g. Normal 26 ± 11 g.	Upper respiratory infection. Otitis media. Marasmus. Died 15 minutes after feeding.	Obstruction of larynx and trachea by clotted milk. Rickets.
A–33–49 2 months Female	6 g. Normal 26 ± 11 g.	Rammstedt, 3 weeks previously. Ran a slight fever for 3 days before death. Died rapidly with high fever.	Infarction of both adrenals — non-inflammatory. Extra dural hæmorrhages.
A–36–26 1 month Male	5 g. Normal 26 ± 11 g.	Had pneumonia and intestinal intoxication. Died in 6 hours after development of cerebral symptoms.	Pneumonia. Primary thrombosis of all dural sinuses and infarction of brain.

leukopenia, high fever and collapse. Cultures of the large bowel contents were negative for dysentery bacilli, but sections showed early inflammatory lesions of the colon.

2. *Obvious infection with death within one to five days of onset.*—(Table II).

Nine cases are included in this group. All of the children had a definite clinical history of colds, fever and convulsions—in short, symptoms pointing to an infection. The weight of the thymus ranged from 13 to 38 g.—all within the normal limits previously recorded. Seven were under one year of age, and 2 were fifteen months and two years, respectively. Four patients died suddenly or unexpectedly after varying periods of illness, while the other 5 were obviously moribund over a period of hours. The importance of this group is that it illustrates the high thymic weight in relatively short but definite illnesses. Three patients had definite infection on gross autopsy or histological examination, *viz.*, acute appendicitis with peritonitis, peribronchitis and interstitial pneumonia, broncho-pneumonia and laryngo-tracheo-bronchitis. It is noteworthy that the infant (A-34-17) with the largest thymus (38 g.) in this group had a purulent tracheo-bronchitis. Two others had a history of cold and fever for three days and showed a marked interstitial pneumonia. As the thymic weights in both cases were low normals, and the glands microscopically showed evidence of "accidental involution," the patients were considered to have died from an infection. The other cases are of sufficient interest to note individually. One (A-35-24) had broncho-pneumonia, rickets and tetany, but the actual cause of sudden death was asphyxiation from aspiration of milk into the larynx and trachea. A second (A-35-84) had been followed for some months because of stridor due to obstruction in the trachea. The child developed fever with evidence of upper respiratory infection and died. At autopsy a large hæmangio-endothelioma of the trachea was found. It almost completely obstructed the lumen after fixation, and as the lungs and trachea showed no inflammatory lesion it was concluded that a mild naso-pharyngitis had resulted in congestion and swelling of the hæmangioma causing asphyxiation. In the third case (A-36-36) the child had been in the hospital for a month with broncho-pneumonia. He was doing well when he developed an otitis media; thirty-six hours later he was found dead in bed. No gross cause for the sudden death was found, but sections showed a most unusual and marked localized hypertrophy of the islets of Langerhans in the head of the pancreas (Fig. 4a and Fig. 4b). The hypertrophy was much greater than could be accounted for by the pneumonia which was in the healing stage. This finding raises the question of death from hypoglycæmia, but unfortunately this cannot be proved as blood sugar studies were not made. The fourth child (A-32-37) had a history of convulsions, tetany and high fever. The autopsy examination was incomplete, but it showed remarkably hyperplastic parathyroids, confirming the diagnosis of rickets with tetany. It seemed likely that this child died of spasm of the larynx.

3. *Sudden death associated with an atrophic thymus.*—(Table III).

In this group of 6 children the thymus weighed from 5 to 7.5 g. All were under one year of age. Three were in hospital for various conditions, were apparently doing well, and died unexpectedly. The causes were, respectively, obstruction of the larynx and trachea by clotted milk, bilateral venous infarction of the adrenals, and primary thrombosis of the dural sinuses and cerebral veins, with infarction of the brain. The fourth had been in hospital, had been discharged cured, and died suddenly at home three weeks later. Histological studies showed an alveolar pneumonia. The fifth was being treated for furuncles of the scalp and died suddenly. The autopsy showed a tracheo-bronchitis and interstitial pneumonia. The last patient was a marantic infant upon whom a Rammstedt operation had been done. She died suddenly two days after operation, although apparently doing well. No definite cause of death could be found, although lung hæmorrhages and a patchy interstitial pneumonia suggested infection.

This group might better be called that of "unexpected death" as in the majority of cases they were known to have a definite disease process for some time, but the point is that they died just as suddenly as the other types, and yet the thymuses were atrophic. It is uncommon to find a definite anatomical cause for the sudden death, although they show obvious

pathological lesions. Other cases could be added to this group, for in going over our protocols a considerable number of unexpected deaths were noted to have occurred in these cases of prolonged illness. The point is, of course, that one cannot say in any case just exactly why the patient dies.

4. *Sudden death with no previous illness and a normal thymus.*—(Table IV).

The cause of death in this group of 9 cases is more difficult to explain than in the previous groups. Close analysis of the clinical history in eight of them revealed that the apparent previous condition of good health was not so definite as was at first thought. This fact, in conjunction with some of the lesions found, points to the fact that the cause of death had perhaps been operative over a longer period of time than had originally been conceived.

The thymic weights varied from 24 to 50 g. Since in these cases the patients were all under one year of age two thymuses were overweight. Of these latter one (A-34-87) had a very definite cause of death. This infant was well, was fed, put out to sleep, and found dead two hours later. The thymus weighed 45 g. but showed no evidences of having exerted pressure on the neighbouring structures. This child had been asphyxiated by the aspiration of clotted milk.

Four of the other 8 cases showed, as always, negative gross findings at autopsy, but sections revealed tracheitis, peribronchitis and interstitial or broncho-pneumonia. Bacteriological examinations were incomplete, but in 2 the heart's blood was sterile, and in 2 it was not cultured.

Two other cases (A-37-7 and A-36-27) showed changes which we consider to be those of a

TABLE IV.

SUDDEN DEATH WITH NORMAL THYMUS AND APPARENTLY NEGATIVE PREVIOUS HISTORY

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–37–7 3½ months Male	50 g. Normal 25 ± 10 g.	Furunculosis for 2 weeks. Temperature 101°. Leukocytes 18,000. Did not seem ill. Found dead.	Interstitial pneumonia. Foci of inflammatory cells in liver. Cellulitis of scalp. Early rickets.
A–37–24 11 months Male	29 g. Normal 26 ± 11 g.	Admitted as a well baby; developed otitis media. Doing well and gaining weight for 2 months. Rise in temperature of 1° for two days. Found dead.	Tracheo-bronchitis and early pneumonia. Left mastoiditis. Heart's blood sterile.
A–34–87 3½ months Male	45 g. Normal 23 ± 10 g.	Well. Found dead in carriage 2 hours after feeding.	Larynx and trachea obstructed by clotted milk.
A–35–86 4 months Male	24 g. Normal 26 ± 11 g.	Being treated for club-feet. Died suddenly, but had had a slight fever for three days. No symptoms.	Interstitial pneumonia with petechial hæmorrhages in lungs and thymus. Soft septic type of spleen.
A–35–87 3½ months Female	27 g. Normal 26 ± 11 g.	Seen 2 weeks previously because of vomiting after meals. Physical examination negative. Died suddenly at home.	Patchy broncho-pneumonia. Bilateral peribronchitis. Petechial hæmorrhages in spleen. Focal inflammation, pons and medulla. Heart's blood sterile.
A–36–27 4½ months Male	28 g. Normal 26 ± 11 g.	Nose bleeds. Vomiting after each bottle. Physical examination negative. Blood count normal. Died suddenly at home.	Interstitial pneumonia with petechial hæmorrhages. Right otitis media. Mild choroiditis.
A–34–110 4 months	39 g. Normal 26 ± 11 g.	Slight cold for day or two. Fed and put to sleep. Found dead 2 hours later.	Marked congestion of lungs with slight infiltration of alveolar walls by polymorphonuclears and possibly an early interstitial pneumonia.
A–36–86 5 months Female	33 g. Normal 26 ± 11 g.	The night before death child seemed well, except that it seemed to breathe noisily. Died suddenly the next afternoon.	Interstitial pneumonia. Mild tracheitis.
A–37–12 2 months Female	25 g. Normal 26 ± 11 g.	Always pale but apparently well. Died at home while being fed.	Interstitial pneumonia. Slight peribronchitis.

fulminating infection, although unfortunately no bacteriological studies were made. In case A-37-7 the thymus weighed 50 g. which is definitely overweight for the average normal. This patient had had a history of furunculosis for two weeks. On admission he had a temperature of 101° F., with a leukocytosis of 18,000. Gross autopsy was negative. Sections showed poorly walled-off furuncles of the scalp, foci of inflammatory cells in the liver, interstitial pneumonia, and early rickets. The clinical history with the leukocytosis, plus the histological findings, point to a fulminating infection. There was no hypoplasia of the aorta or adrenals and no hyperplasia of the lymphoid tissue as is supposed to occur in status thymicolymphaticus.

Patient A-36-27 had a history of epistaxis and vomiting off and on for two weeks before dying suddenly during a convulsion. Physical and blood examinations were negative. Histological studies showed a definite interstitial pneumonia, with intra-alveolar hæmorrhages of the lungs, left otitis media, and a mild choroiditis of the right eye. The thymus was of a normal weight, weighing 28 g., and again there was no hypoplasia of adrenals and aorta or hyperplasia of lymphoid tissue.

The other 2 patients showed indefinite pathological changes, and no lesions of diagnostic importance were present. Patient A-34-110 had had a history of having a slight cold for several days. It was fed, put out to sleep, and found dead. Autopsy showed only marked congestion of the lungs with increased cellularity of the alveolar walls, associated with a few polymorphonuclears and a few isolated streptococci. The findings suggest, but do not substantiate, an infection. The thymus weighed 39 g., only two grams over the maximum weight for this age, so that it cannot be classified as abnormal. Case A-35-86 was a well baby of the Foundling Division who was found dead in bed. Analysis of the temperature chart showed that for three days previously its temperature had been up one degree over the previous month's, although it had had no symptoms. The gross autopsy was negative except for a slightly enlarged soft spleen. Sections showed an interstitial pneumonia and an unusually cellular spleen with scattered hæmorrhages. The thymus, although it weighed 24 g., seemed slightly atrophic as judged by sections.

Six patients in this group showed inflammatory lesions, mainly in the respiratory tract, while 2 had indeterminate lesions and 1 died of asphyxiation.

DISCUSSION

A comparison of the average weight of the thymus in groups 1, 2 and 4 is of interest. The average weight is, respectively, 29.3 g., 20.8 g., and 33.3 g. In spite of the fact that group 4 had two of the largest thymuses in the series, the average weight in this group is only four grams more than in group 1. As can be seen, the weight in the group of definite bacterial infection of less than 24 hours' duration is practically the same as the group in which sudden death occurs in apparently well children. Furthermore, as would be expected, the average weight in group 2 is a good deal lower than in the other two groups because of the longer duration of the disease. As Boyd[2] has shown, death from one day to one week after the onset of an illness results in a moderate reduction of thymic weight.

Group 3 demonstrates that unexpected death may and does frequently occur when the thymus is small and atrophic, both when a child is apparently well and when a definite illness has been present for some time. This agrees with the findings of the Status Lymphaticus Committee, who report a number of such cases.

In none of our cases was there any evidence of hypoplasia of the aorta. As pointed out in the Committee's report "this condition appears to be recognized by general impressions given to the eye and finger or by measurements which have not been correlated to measurements of stature, etc." In other words, no adequate standards for the normal have yet been worked out.

The lymphoid tissue in this series showed no outstanding variation from the normal. The lymph nodes in childhood are extremely variable in any case and, because of this, care must be exercised in judging abnormal enlargement. Here, again, the naked eye is untrustworthy and no accurate normals are known. To estimate this correctly, area or volume estimations would have to be made of different age-groups as in the case of the thymus. The Status Lymphaticus Committee found in a normal series of cases from 0 to 16 years no relationship between the weight of the thymus

and the amount of lymphoid tissue in the various parts of the body in so far as this amount can be indicated by volumetric measurements. Similarly, there appeared to be no concommitant general hyperplasia of lymphoid structures where the thymus was unusually large, although the data collected were small.

Hypoplastic adrenals have always been considered part of status thymicolymphaticus. Experimentally, removal of the suprarenals has resulted in thymic and lymphoid tissue hyperplasia. The hypoplasia is supposed to affect both cortex and medulla, or either one alone. To arrive at an accurate opinion of such hypoplasia accurate measurements of cortex and medulla (as done by Hirning and Farber[14] in mongolism) in a normal and abnormal series are necessary, in addition to the weights of the organ. In this series the weights are all comparable to the normal and none showed any obvious gross or microscopic evidence of hypoplasia.

The cause of death in so-called status thymicolymphaticus has been explained on one of these five theories:[15] (1) death is due to pressure of an enlarged thymus on the trachea, blood vessels and nerve trunks; (2) it is a result of the constitutional defect manifesting itself through an injurious raising of the vagus tone, together with a deficiency of the chromaffin system and weakness of the sympathetic system; (3) it is a result of hypersusceptibility to physical and chemical agents; (4) it occurs through anaphylaxis; (5) it results from an abnormal thymus secretion of a general lymphotoxæmia.

It is generally felt nowadays that death from pressure on the trachea is a rare cause of death and takes a good deal of proving. The allergic theory is promising and interesting, but as yet is only a theory. Waldbott,[10] of Detroit, is a vigorous upholder of the allergic theory, but his pathological evidence is weak and certainly the lesions he describes are non-specific. Hypersusceptibility to physical and chemical agents is of interest particularly from the viewpoint of the effect of cold.[15] Evidence has recently been brought forth that some human beings are sufficiently susceptible that death may result from exposure. The other theories are highly theoretical and will not be discussed. We feel that in a certain percentage of these cases of sudden death a bacterial agent of one type or another is the causative factor. The exact mechanism is obscure and may be due to hypersusceptibility to the infecting organism or to lack of immunity response in the young. The latter has been demonstrated experimentally by Kahn.[16] He found if small doses of virulent streptococci or staphylococci were injected subcutaneously that in adult rabbits furuncles were formed. On the other hand, young ten-day-old rabbits developed no local inflammatory lesions, but instead a generalized septicæmia from which many died in from twenty-four to forty-eight hours. This phenomenon he believes is due to immature functioning of immunity in the young.

We believe that the mild inflammatory changes in various parts of the body in many of our cases are indicative of a fulminating infection either generalized as in A-37-17 or localized to the respiratory tract. It is possible that the same is true of the cases showing the indefinite lesions. It is urged that autopsies in these sudden and unexpected deaths be very complete, with extensive bacteriological investigation and numerous sections particularly of the respiratory tract, including the trachea and large bronchi. Care should be exercised in examining the larynx and trachea to exclude death from asphyxiation due to aspirated milk or other foreign bodies. Further, it is important to inquire into the preceding history, as in the excitement of a sudden death, minor and trifling symptoms are forgotten.

Finally, we do not necessarily believe that all patients such as these die from an acute infection, and we would like to emphasize that in some cases the pathologist has his limitations and that his technique is not sufficiently developed to show changes which perhaps only the biochemist and physiologist can demonstrate. Further, it is our belief that the number of sudden deaths ascribed to status thymicolymphaticus could be reduced greatly by thorough autopsy examinations.

SUMMARY

A series of 30 cases of sudden death in infancy has been analyzed. Nineteen of these at autopsy showed definite inflammatory lesions, indicating, it is believed, a fulminating bacterial infection. Four were asphyxiated from a mechanical cause, 3 from the aspiration of milk, and 1 from a large hæmangioma of the trachea. The remaining case was of theoretical importance, because in addition to a healing pneumonia the child

had a most remarkable localized hypertrophy of the islands of Langerhans.

Five of the remaining 6 patients showed indefinite inflammatory lesions, but taking into consideration the clinical and pathological findings, which were all similar, it is possible that they also died of a fulminating infection. They were characterized by a vague preceding history, sudden death, and at post-mortem by interstitial pneumonia, petechial hæmorrhages in the lungs, thymus and pericardium, and sometimes by a septic type of spleen. The sixth patient probably died of laryngeal spasm associated with tetany. The thymuses, with two exceptions, were not sufficiently enlarged to be abnormal. One of these children died from the aspiration of milk, while the other showed evidence of a generalized infection.

It has been shown that the weight of the thymus in the sudden death group of apparently well children is the same as in the group which died in twenty-four hours from the onset of definite clinical signs of infection. None of the classical features of the status lymphaticus syndrome were present. Further, sudden death has frequently occurred where the thymus was small.

It is suggested that many cases of sudden death, although not all, are caused by fulminating infections possibly associated with immature immunity on the part of the infant. The lesions commonly found are an interstitial pneumonia and a peribronchitis. Lastly, it is urged that post-mortem examinations in cases of sudden death be very thorough, from both the bacteriological and pathological viewpoints, before yielding to the temptation of making the easy diagnosis of status thymicolymphaticus. When no pathological lesion can be found the pathologist must look to the biochemist or endocrinologist for help.

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THE INTERNAL FRONTAL HYPEROSTOSIS SYNDROME

(WITH REPORT OF TWO CASES)

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THIS name has been applied to a condition occurring chiefly, if not entirely, in women about middle age and characterized by peculiar alterations in the skull and by mental and physical disturbances.

Thickening limited to the internal plate of the frontal bone has been known to occur for hundreds of years. Morel[6] reported that Morgagni and Santorini observed internal hyperostosis of the frontal bone in an autopsy on an old woman in 1765. Naito,[2] Casati,[3] and Greig[4] have called attention to the condition. Morel covered the literature up to 1930 and reported a living case. That year a second living case was reported by Van Bogaert,[7] and in 1932 a third case by Schiff and Trelles.[8] In 1928 R. M. Stewart, under the title of "Localized Cranial Hyperostosis in the Insane" reported, on 3 cases that he had followed through to their termination and also reported on several other cases that he had observed. In 1935 and 1936 Sherwood Moore[9] reported 72 cases found amongst 415,944 admissions to a group of hospitals, an incidence of 0.014 per cent. The clinical histories of 59 cases were available for study. His papers[9, 10] adequately discuss the changes in the skull and the associated physical and mental disturbances. Carr[11] reported on 17 cases and discussed their treatment. Schneider[14] and Harbitz expressed their views on the subject, and Henschen[13] reported his findings in a series of 50 cases. Eisen[12] published a detailed report of a living case and briefly reviewed the literature. In addition to these a number of papers dealing with the subject have recently appeared, especially in the foreign literature. Fracassi and Marelli[15] reported 4 cases. Pende[16] reported several cases, and suggested that the syndrome be named "Endocranial Hyperostosis of Morgagni".

Briefly, the characteristic features consist of peculiar mental and physical alterations occurring practically always in women at or about the menopause. Two doubtful cases occurring in men and a case in a woman of 32 were reported by Moore. The changes in the skull consist of a thickening of the internal plate, chiefly of the frontal bone, but may also occur in the other bones. The patients are usually obese or at any rate over the average weight for their age and height. Many of them exhibit metabolic and endocrine changes as shown by a lowered basal metabolic rate and diabetes mellitus and insipidus. The symptoms consist of severe localized or generalized headache, easy fatigability, insomnia, noises in the head, dizziness, crying spells and others, all of which are usually regarded as of psychoneurotic origin.

The following is a report of two cases.

CASE 1

A woman, aged 57, weighing 157 lbs., para-8, was first seen in March, 1937, complaining of parietal headaches for four years following a fright, buzzing noises in both ears for twenty years, discharging ears for two years. The headaches were severe and burning in character requiring constant applications of cold towels. No relief was obtained from medicines. She had felt very weak for several months. Eating much food aggravated the headache. She suffered from constipation and flatulence. There had been no recent change in weight. Menopause was uneventful at 44. The patient had always been very excitable, slept poorly and perspired a great deal. She felt depressed almost constantly but had had no crying spells.

Physical examination.—Bilateral arcus senilis, striæ of both lenses, some blurring of disc margins, moderate sclerosis of the retinal vessels. Hearing was diminished in both ears, especially the left. BC. greater than AC. both ears. The right ear presented a chronic otitis externa and a central perforation of the drum from which oozed serous fluid. The drum of the left ear was scarred and the posterior inferior quadrant was replaced by a thin scar. The nose and throat were not remarkable. The heart was enlarged 2 cm. to the left, second aortic sound accentuated, blood pressure 170/90. Peripheral vessels thickened. E.C.G. showed left axis deviation, P.R. interval 0.2 seconds. Nervous system normal, apart from a tendency to sway to the right when patient stood with feet together and eyes closed.

Blood examination.—Hgb., 80 per cent (10.5 g. Sahli); erythrocytes, 3,250,000; leucocytes, 8,000. Smear slight hypochromic anæmia. Serum calcium, 10.1 mg. per 100 c.c.; serum phosphorus, 2.6 mg. per 100 c.c.; serum phosphatase, 8.3 units (normal 6 to 11 units). Urine was negative. Basal metabolic rate, +18 per cent.

The diagnosis in this case was made by the roentgenologist, Dr. D. Eisen, who was asked to report on the condition of the mastoid antra. In addition to the chronic bilateral mastoiditis he reported:

"There is an early hyperostosis of the internal table of the frontal bone ending sharply at the coronal suture. It does not as yet involve the orbital plate although there appears to be beginning thickening of the posterior wall of the frontal sinus, the lumen of which, however, is not invaded. The hyperostotic bone is laid down in characteristic billows. There is no evidence of any bone absorption. The hyperostosis extends into the diplœ but does not in any way involve the external table. On the postero-anterior view the entire frontal bone stands out because of diffuse increase in its density. The roentgen appearance is characteristic of the internal frontal hyperostosis syndrome." X-rays of the long bones revealed a slight thickening of radius, ulna, tibia and fibula along the course of attachment of the interosseous septa and on the lateral side of the upper quarter of the tibia. The entire shaft of the fibula showed slight rarefaction.

CASE 2

Age 52, weight 220 lbs., para-5. First seen in March, 1937, complaining of severe frontal and parietal headaches for 3 years, ringing noises in the ears for 2 years, eczema of ears and ear canals for 2 years. The headaches were very severe in character and were present almost continuously. She wept frequently at the slightest provocation, worried a great deal about trivial matters, slept poorly and felt miserable all the time. Eczema of both ears had been present for some years and had responded but poorly to treatment. Her appetite was fair but she ate sparingly for fear of gaining weight. Menstruation was still occurring fairly regularly. She preferred warm weather to cold weather, her features and skin had not changed, nor had there been any loss of hair. There were occasional aches and pains in the arms and legs of a rheumatic nature and she had moderately enlarged veins in both legs.

Physical examination.—Patient obese, of pituitary type (Fig. 4). Scaling of lid margins, external ear canals full of soggy white material, pinnæ red and scaling. Digestion of scale with potassium hydroxide showed numerous branching mycelia typical of a fungus. Hearing impaired in both ears. Thyroid not palpable, skin normal in texture, hair and features fine. Heart and lungs normal. Blood pressure, 120/80. Abdomen pendulous and obese. Varicose veins in both legs. Reflexes and sensation normal. Patient wept during the examination, memory for remote events poor, attention good, intelligence average.

Blood examination.—Hgb., 80 per cent; erythrocytes, 4,000,000; leucocytes, 6,500; smear slight hypochromic anæmia. Serum calcium, 10 mg. per 100 c.c. Serum phosphorus, 3 mg. per 100 c.c. Serum phosphatase, 7.6 units. The urine was negative. Basal metabolic rate, normal. Fasting blood sugar, 95 mg. per 100 c.c.

In view of the similarity to the previous case a tentative diagnosis of the internal frontal hyperostosis syndrome was made and the patient x-rayed. The report stated "there is no evidence of any increased intracranial tension. There is considerable new bone formation springing from the internal table of the horizontal portion of the frontal bone and extending for about 1.5 cm. posteriorly beyond the coronal suture so as to involve the adjoining part of the parietal bones. The vertical plate of the frontal bone is not apparently affected. This hyperostotic bone shows an average measurement of about 1.5 cm. in thickness. The diploe is not involved. On the postero-anterior view the entire frontal area shows considerably increased thickness." The long bones appeared normal except for slight degree of ossifying periostitis about the medial third of the left fibula.

Both cases were treated with the usual analgesics, sedatives and hypnotics but to no avail. The only drug that in any way ameliorated the severity of the symptoms and allowed the patients a respite was ergotamine tartrate (Gynergen) given orally and hypodermically.

They have continued to take it by mouth and are still obtaining relief with it.

DISCUSSION

This is an interesting syndrome but since its mechanism is not clear it would not be profitable to discuss it at any length. The fact that the patients were clearly benefited by ergotamine tartrate relates the headache to migraine. The fact that most of these patients present the characteristics of psychoneurosis suggests that perhaps ordinary psychoneurosis is an organic condition with as yet an unrecognized structural change in the brain.

There is some question as to its being a definite syndrome. In favour of its existence as a disease entity is our second case which was diagnosed in advance, and also the fact that it exists only in women at or about the menopause. Against the belief that it is a specific disease entity is the fact that we have been mistaken in its tentative diagnosis on a number of occasions.

The earlier papers on the subject related the disturbances to the thickening of the internal plate of the frontal bone and to the adhesions of the dura in that region. However more recent papers have considered the possibility of pituitary and hypothalamic disturbances. Indeed

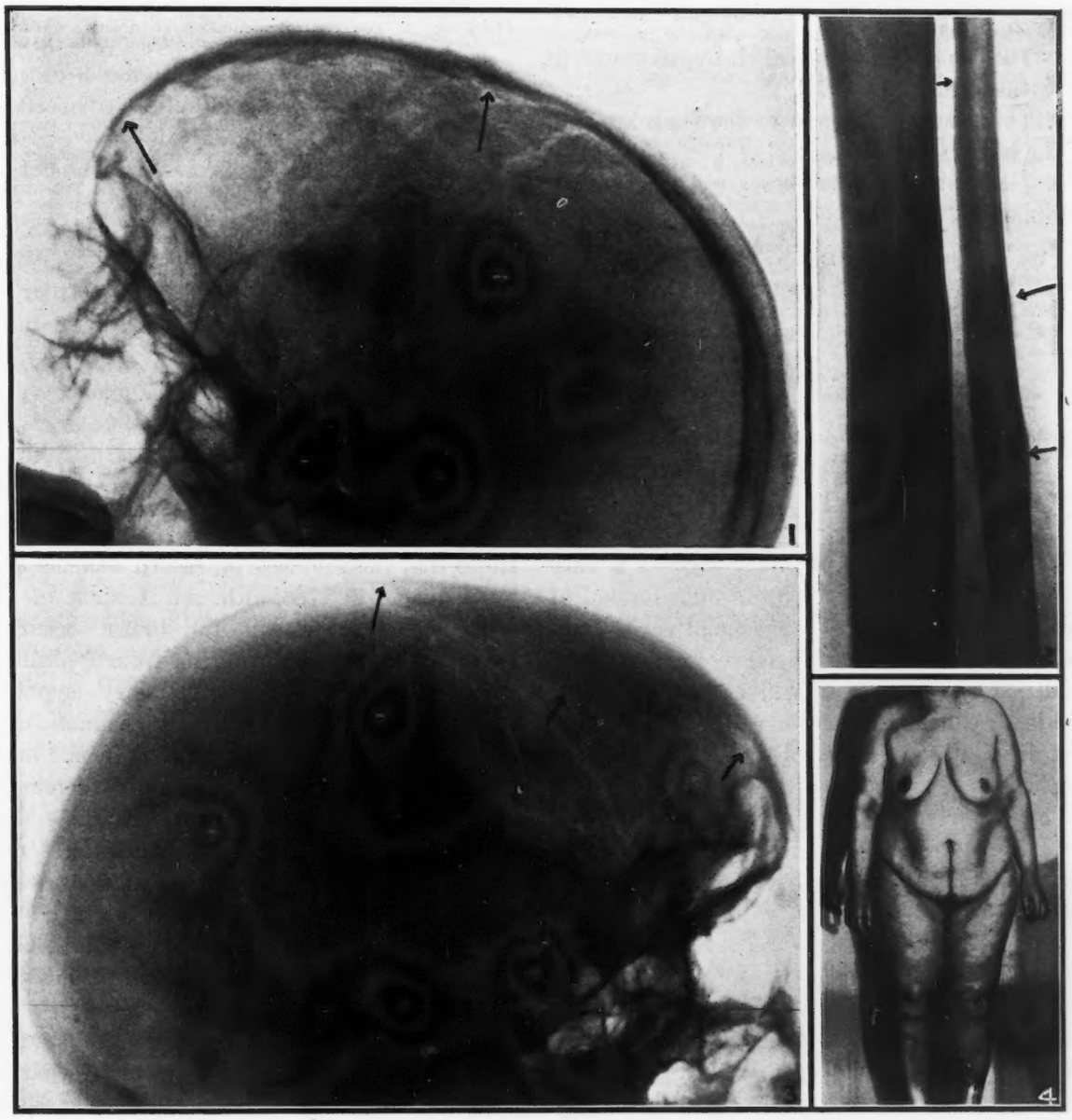

Fig. 1. Case 1.—Early hyperostosis of the internal table of the frontal bone laid down in billows ending sharply at coronal suture. **Fig. 2.** Case 1.—Slight thickening of left tibia and fibula along interosseous crests. **Fig. 3.** Case 2.—Hyperostosis of internal table of frontal bone extending posteriorly for 1.5 cm. to involve parietal bones. **Fig. 4.** Case 2.—Photograph of patient showing nature of obesity.

Pende states that not only was the symptomatology indicative of such disturbances but that the sella turcica showed x-ray changes in all his cases. This latter was not the case in our patients. In reviewing the various theories regarding the etiology and pathogenesis of the syndrome, we feel the most plausible explanation to be a disturbance of the pituitary gland and/or the adjacent structures.

SUMMARY

Two new cases of the internal frontal hyperostosis syndrome have been presented and the following new facts have been adduced.

1. One case was diagnosed in advance of the x-ray findings.

2. The long bones revealed hyperostosis in each case.

3. There was no change in the concentration of the blood phosphatase.

4. The headache was greatly relieved by ergotamine tartrate.

We are indebted to Dr. W. R. Campbell for the phosphatase estimations.

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TERTIARY SYPHILIS OF THE BREAST*

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TERTIARY syphilis of the breast is a rare condition. Even before the introduction of serological tests, and the consequent early diagnosis and treatment of primary syphilis, the condition was rare. It will probably become still less common in the future. It is so unusual that in the Montreal General Hospital, which has been in existence for more than 115 years, we have a record of only one authentic case, and have been able to find fewer than 50 reported in the literature. The majority of these reports have appeared in European publications of the latter part of the nineteenth century. The diagnosis in this pre-Wassermann era was mainly confirmed by the "therapeutic test" of response to treatment with mercury and iodides. Lloyd Thompson[1] of Hot Springs, Arkansas, reporting a case in 1920, gives a comprehensive review of the literature on this subject. He states that the first case on record was described by Sauvages in 1768, although Anstruc in 1736 spoke of "cancer" of the breast occurring frequently in women suffering from syphilis.

As one would expect, tertiary syphilitic lesions, *i.e.*, gummata, are more common in the female than the male breast. The female breast is a definitely functioning organ, whereas the male breast is but a rudimentary vestige. One author, quoted by Thompson, states that "more than three-quarters" of the reported cases have been in women. Actually, we believe, the relative incidence in women is higher than this, as we have been unable to find any detailed description of it occurring in a male patient.

Gummata of the breast are, of course, no different pathologically from gummata occurring elsewhere in the body, and pursue the same course. They first appear clinically as one or more hard painless lumps, and later tend to undergo central softening and necrosis, with the

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formation of sloughing, punched-out ulcers. Two types of lesion are most commonly described, either single or multiple discrete tumours, or a deep-seated infiltration of the breast tissue and adjacent structures, such as in the case which we are reporting. The condition is usually painless, but in some cases pain may be a prominent symptom. Enlargement of the axillary lymph nodes apparently does not occur unless secondary infection enters through ulcerated areas in the skin. In our own case there was no axillary adenitis when the patient was first seen, but after a prolonged period of ulceration the axillary lymph nodes became enlarged and quite hard.

Legrain[2] reports a case similar to our own, with multiple lesions of the breast, scarring, and bronzed pigmentation of the skin. In his opinion these lesions originated outside of the glandular tissue of the breast. There was marked involvement of the axillary lymph nodes, one of which was described as being "as large as a hen's egg". In view of the scarring and pigmentation of the skin in this case it may be assumed that some secondary infection had been present.

It is known that syphilis can imitate almost any pathological condition, and this is particularly true of tertiary syphilis of the breast. It must be differentiated from chancre, abscess, benign tumours, carcinoma, sarcoma, tuberculosis and actinomycosis, according to the course of the disease and the stage in which it is seen.

Paterson[3] reports a case which was operated on for sarcoma. Following operation the wound broke down, subsequently healing under anti-syphilitic treatment. Bissell[4] describes other cases where breasts originally diagnosed as carcinomatous later proved to contain gummata.

It is usually impossible to make a definite diagnosis of this condition from a simple physical examination. The history is very often negative, and it is believed that these tertiary lesions may in some cases be late manifestations of congenital disease. The clinical diagnosis can be confirmed by serological tests; biopsy with microscopic examination of removed tissue, where practicable; bacteriological examination of scrapings from ulcers, when present; injection of this material into guinea pigs; and x-rays of the lungs and chest walls. Finally, the response to anti-syphilitic treatment may be observed.

The treatment of tertiary syphilis of the breast is, of course, the same as that of tertiary syphilis elsewhere in the body.

CASE REPORT

Mrs. A.B., aged 57, first came to our attention on November 14, 1928, when she was referred to the Out-patient Department of the Montreal General Hospital with a diagnosis of "inoperable carcinoma of the breast". The impression of one observer at this time is briefly recorded as follows: "A scirrhous carcinoma of the right breast involving the ribs. There is extensive contraction and cicatrization, with destruction of breast tissue. Very little ulceration. No glands palpable, no pleural involvement."

The patient was first referred to the department of pathology, where a wax moulage was made of the condition for teaching purposes. She was then advised to return for a biopsy and further investigation. She did not return, and was completely lost sight of for three years. On August 20, 1931 she again came under observation, when she was admitted to the surgical ward of the hospital.

Complaints on admission. — Ulceration of both breasts.

History of present illness.—Six years ago the patient met with an accident in which she received a blow on the right breast, a steel of her corset being jabbed into the breast. A lump appeared shortly after this at the site of injury which she treated with poultices. Following this the lump disappeared, but the breast began to ulcerate. This ulceration became more extensive, the lesions refusing to heal. In November, 1926, she was seen at the Montreal General Hospital, but failed to report back for treatment, and the breast continued to ulcerate. About Christmas, 1930, the left breast began to ulcerate. On August 13, 1931, she suffered a severe hæmorrhage from one of the lesions on the right breast, which caused her to seek further treatment. She was admitted on August 20, 1931.

Family history.—Nothing relevant to present illness.

Personal history.—Married. Five children alive and well. One miscarriage; one child stillborn.

Fig. 1

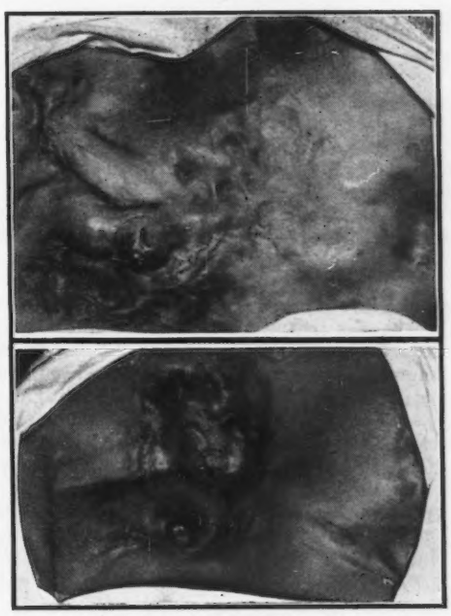

Fig. 2

Fig. 1.—Showing the condition of the breast when first seen in November, 1928. **Fig. 2.**—Wax moulage of the same breast in August, 1931.

Physical examination.—The right breast was almost gone, except for the nipple and a small amount of breast tissue lateral to it. The destroyed breast was replaced by dense scar tissue, ulcerated in numerous places. The colour of this varied from white cicatricial tissue over the upper sternum to that of a deep reddish or livid hue along the edges of the tumour. There were multiple nodules of varying size over both sides of the chest. On the right side the disease was more extensive, reaching up to the base of the neck. The nodules were quite firm, but not stony hard. Over the left breast, above the nipple, was scar tissue fixed quite firmly to the thoracic cage. The skin was not movable over this area. On palpation the involved area was found to be more extensive than appeared on inspection. Firm nodules could be felt as far out as 2 cm. beneath normal-appearing skin. There was no pain or tenderness, and no sensation was noted on pin-point pressure over the scar. Firm digital pressure, however, was felt. A narrow band of deep red, with a serrated border, could be observed spreading out from the edges of the growth.

Glandular system.—No epitrochlear nodes were palpable; a few nodes palpable in left axilla; none in right. The inguinal nodes palpable.

Eyes.—Pupils round, regular, equal, reacting to light. No pathological eye signs were noted.

Heart.—No enlargement. The sounds slightly muffled at apex; no murmurs heard. The pulse was of low volume and tension, slow and regular. Blood pressure, 120/80.

Lungs.—Anteriorly, examination was made difficult by the local condition. Posteriorly there was impaired resonance in the right apical region and the breath sounds were increased, with both vocal and tactile fremitus accentuated. An occasional râle was audible at the right base, which disappeared on coughing.

Abdomen.—Negative.

Nervous system.—

Reflexes	*Right*	*Left*
Biceps	2 plus	2 plus
Triceps	2 plus	2 plus
Abdominals	0	0
Knee jerks	2 plus	2 plus
Ankle jerks	plus	plus
Plantar	extension	very slight flexion
Gordon	?	0
Chaddock	0	0
Oppenheim	0	0

Urinalysis.—Negative.

Blood Wassermann.—August 21, 1931, 3 plus; August 27, 1931, 3 plus.

On August 24, 1931, a biopsy was performed and a section about 2½ inches by ½ inch removed under local anæsthesia from the lower margin of the involved area of the left breast. Considerable bleeding occurred. The wound was closed with dermol interrupted sutures and a dry dressing applied.

Pathological report.—"The sections consist of skin and subcutaneous tissue. The epidermis is hypertrophied. The capillaries are markedly dilated. The subcutaneous tissue shows considerable scarring. Throughout the whole section is seen a more or less diffuse inflammatory exudate consisting of lymphocytes, plasma cells, large mononuclears and a few eosinophiles and polymorphonuclears. Throughout the tissue there are numerous multinucleated giant cells. Many of these are single, others are in groups and are lying in the inflammatory exudate without any definite tubercle structure about them. In other places they are grouped in small tubercle-like structures; but these do not possess the typical endothelioid reticulum of tuberculosis. In the subcutaneous tissue is a rather large area of necrosis in which the architecture of the tissue can still be discerned. About this area the inflammatory reaction is intense and giant cells are numerous. No actinomyces or blastomyces have been found nor have we been able to demonstrate tubercle bacilli in specially stained sections. There is no evidence of tumour. We feel that this is probably a syphilitic lesion and make a tentative diagnosis of such, and suggest that another piece of tissue be sent for animal inoculation. Spirochæte stains are being run and will be reported on later."

On September 9, 1931, a guinea pig was inoculated with material from one of the ulcers of the right breast. Examined on November 25, 1931, this animal showed no evidence of tuberculosis. Special spirochæte stains failed to demonstrate any organisms.

X-ray of the chest on August 21st, showed the following. "The shadow of the right breast is not seen. There is no evidence of metastases in the parenchyma of the lung. There is a generalized increase in the bronchial and peribronchial thickening and an increase in the root shadows, such as is seen with repeated attacks of bronchitis. There is a calcified area on the right side at the level of the transverse process of the first thoracic vertebra. There is no fluid, no consolidation and no tuberculous infiltration in either lung."

A final diagnosis was made of tertiary syphilis of the right breast with extension to the left breast.

From August 31, 1931, to September 25, 1931, the patient was given an intensive course of antiluetic treatment, consisting of alternating doses of novarsenobenzol intravenously and bismogenol intramuscularly. She was discharged from hospital on September 26, 1931.

The following note was made on discharge:—"There is a definite improvement in the lesions. Some of the sinuses have closed up. The redness about the margins of the affected area is lessened considerably. There is no evidence of further spread. The patient feels better generally."

A "follow-up" on this case since discharge shows the local condition healed. The patient, however, is now developing symptoms of general paresis, with characteristic mental changes, which serves to further confirm the diagnosis of syphilis.

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PUERPERAL SEPSIS*

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IN all medical literature probably no subject is more frequently mentioned than puerperal sepsis. I myself have contributed a good many pages to it so that now it is hard for me to find an approach that will not entail repetition. In accepting your invitation to speak here today I was painfully aware of this and realized that my chief object must be to report on any recent progress made in our understanding of the etiology and of the underlying pathological processes and on improved methods of prevention and treatment.

In the last twenty years there has been considerable progress in all of these directions but that progress has not so far been reflected in any marked diminution in the incidence of or in the death rate from the disease throughout the world. That must mean that the great mass of the medical profession is not yet aware of these advances or, being aware, has not been able to apply them in prophylaxis and treatment.

ETIOLOGY

In the year 1863 Mayerhofer demonstrated microorganisms in the lochia of puerperal women. Six years later Coze and Feltz in Strassbourg found in the blood of a patient with puerperal fever numbers of small objects isolated or arranged in chains. These were also demonstrated by others in the lochia of infected women, but it remained for Pasteur to demonstrate the causal relationship of these organisms to puerperal fever. The year was 1879. Long before this Charles White in England, Semmelweis in Austria, Holmes in America, and Simpson in Scotland had proved the contagiousness of the disease and had laid down rules and regulations for its control. The inauguration of antiseptic surgery through the genius of Lister gave the means of extending that control. Unfortunately, the beneficial effects of Listerism were not nearly so pronounced in obstetrical as they were in surgical practice, and with the advent of aseptic technique the same discrepancy has obtained. This discrepancy is partly due to the fact that the technique of surgeons in general is more thorough than that of obstetricians and midwives in general, but to a much larger degree it is attributable to the fact that the problem of the prevention and treatment of infection is a much harder one in obstetrics than it is in surgery. The field of the surgical operation can be rendered sterile, the vagina of the parturient patient cannot. The puerperal uterus is a much better nidus for the growth of organisms than is the clean-cut surgical wound, and if infection does take place the spread, by lymphatics and blood stream, from the uterus is easier than from any other region of the body. Means of treating puerperal infections are woefully inadequate and unsatisfactory—what the new drug sulfanilamide may be able to do for it will be discussed later—so that our great effort should be directed to prevention.

Sure methods of prevention against any disease must be based upon accurate knowledge of its causation. If it is an organismal disease, that means knowledge of the kind of organisms, their normal habitat, how they are conveyed to the host, how they enter the host, and what defences the host has against them. The fight against diphtheria, typhoid, yellow fever, and malaria has been won because methods of prevention have been so precisely defined and so energetically carried out. This has been possible only because every fact relating to the life history of and reactions to the organisms has been discovered. In recent years we have learned a great deal regarding all these things in puerperal infections, so that, whilst our knowledge is far from complete, we can be much more dogmatic in laying down regulations for prevention than we formerly could. Rules based on general principles and general observations are not so apt to be rigidly observed as those founded upon precise knowledge of cause and effect.

At the present time we think we have facts to substantiate the belief that there are two main

* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, June 24, 1937.

types of puerperal infection, one caused by a virulent strain of an aerobic hæmolytic streptococcus, and the other by an anaerobic streptococcus. We shall deal mainly with these two types, not forgetting, of course, that there are infections due to other organisms.

Hæmolytic streptococcus infections.—This is the type of infection which was responsible for the epidemics which ravaged maternity hospitals in by-gone years. It is still responsible today for minor epidemics in hospitals and sanatoria, for the occurrence of groups of cases in communities and for sporadic cases. Let us, therefore, consider what facts we have regarding the causative agents, taking up in the first instance the bearing of these facts on the prevention of the disease.

Hæmolytic streptococci are widely distributed organisms. They are characterized by certain morphological appearances and cultural characteristics, and, notably, by their hæmolyzing action in blood agar plates. Organisms coming within this category are, however, not all alike, and in recent years great progress has been made in differentiating them into groups by various cultural, chemical, serological and precipitin tests.

Until a very few years ago every hæmolytic streptococcus was regarded as a certain potential producer of infection. Now, as the result of the pioneer work of Lancefield and of other workers following her, it is possible to differentiate various groups of these organisms and to distinguish sharply between those which are pathogenic and those which are not. Lancefield by her precipitin test differentiated hæmolytic streptococci into several groups—named A, B, C, D, etc. All of these strains may be recovered from the human subject but only those belonging to Group A cause serious infections, the others apparently being mainly saprophytic. This Group A beta-hæmolytic streptococcus is the cause of the various human streptococcal diseases; tonsillitis, acute ear infections, scarlet fever, acute respiratory infections, erysipelas, wound infections, and puerperal sepsis. The same organism may give rise to any one of these, and in transmission from an individual with one disease may cause an infection of a different organ or system in another. Thus puerperal sepsis may be the result of the conveyance of the streptococcus from an individual with tonsillitis and vice versa.

It is with the Group A hæmolytic streptococcus, therefore, that we are concerned in the type of puerperal infection with which we are now dealing. What facts have we regarding it which will help us in preventing its entrance into the genital passages of our parturient and puerperal patients? That is the main problem—to prevent its entry, for, apparently, if it does enter it is practically certain to cause a severe and often fatal infection.

When a hæmolytic streptococcal infection occurs in our practice we can no longer quiet our conscience with the thought that the organisms were already in the vagina or cervix prior to labour. Streptococci are found in these situations in from 1 to 3 per cent of pregnant women: our own investigations in the Sloane Hospital show the latter figure. It was noted that a severe puerperal infection was a great rarity in these women and the explanation was forth-coming, when the organisms were grouped by the Lancefield method, that they practically all belonged to Group B and were therefore non-pathogenic. Those who have worked intensively in this field — Lancefield, Colebrook, Hare, and others—have found the same thing, so that we must conclude that autogenous infection with a hæmolytic streptococcus already present in the genital passages prior to labour is extremely rare. It is possible, however, that Group B organisms may be responsible for some very mild infections.

The most common sites for the Group A hæmolytic streptococcus are the throat and the nose. It is the common organism in cases of acute tonsillitis, sinusitis, mastoid infection, and other upper respiratory diseases. But it may also be present in the nose and in the throat of persons exhibiting no symptoms or signs of infection. These people are merely carriers, but they are as potentially dangerous as those with acute disease. The literature abounds with cases in which it has been proved beyond a doubt—by serological and other tests—that the source of the puerperal infection was a carrier; doctor, nurse, attendant, relative, friend, or the patient herself, who harboured the organism in the nose or throat. One of the first to demonstrate scientifically the importance of the streptococcal carrier was Meleney, who, along with Stevens in 1926, traced the infection of surgical wounds to the presence of streptococci in the noses and throats of the surgeons and their assistants.

When in the year 1927 we had a severe epidemic of puerperal sepsis in the Sloane Hospital for Women in New York, Meleney undertook the bacteriological investigation, and established the fact that the organisms of certain of the infected patients were serologically identical with those recovered from the throats and noses of certain members of the staff. Since then many other workers have established this direct relationship between the streptococcal carrier and the occurrence of puerperal infection in those patients with whom they may have come in contact. Let me quote to you two striking case histories from Smith's series in Aberdeen.

"Cases 53, 55, and 56, were all confined in the same nursing home by different doctors, and all developed puerperal infection. Cases 53 and 55 died, and Case 56 recovered. In this instance it was shown that two members of a nursing staff of six were carriers of the same type of hæmolytic streptococcus. Removal of all infected cases, closure of the home, and transference of nurses brought the small, but unfortunate, epidemic to an end."

"Cases 59, 60, and 61. The final three cases in the present series can be taken together, as they apparently had a common source of infection. A doctor in a country practice attended two confinement cases, Mrs. L.S. and Mrs. R. on the same day. Both cases had normal labours. Mrs. R. had a rigor two days later, and the first symptom of Mrs. S.'s illness appeared four days later. Five days after these patients were confined, the doctor attended a third patient, Mrs. J.S., who also had a normal labour, and this patient had a rigor on the day following her confinement. The homes of the various patients were situated several miles apart, and the only factor common to all three was the doctor. All three patients rapidly became seriously ill. Mrs. R. was admitted to hospital on the fifth day after confinement, Mrs. L.S. on the sixth, and Mrs. J.S. on the third. On admission all three patients were found to have much fever and rapid pulse-rates, all showed intense signs of uterine infection, with profuse purulent discharge, pelvic and abdominal peritonitis. Mrs. R. and Mrs. L.S. died four days after, and Mrs. J.S. on the day following admission.

"Bacteriological examination showed that all three cases had uterine infections due to hæmolytic streptococci, and from Mrs. R. and Mrs. J.S. the same organism was cultured from the blood. Death in Mrs. L.S.'s case was apparently due finally to pulmonary thrombosis. The patients failed to show hæmolytic streptococci in cultures made from secretions obtained from the nose and throat. The first throat swab taken from the doctor showed only scanty colonies of hæmolytic streptococci, but a second specimen taken several days later showed a profuse growth. These specimens were obtained from the doctor after all his cases had been admitted to hospital.

"Serological examination of the strains showed that all strains obtained from the uteri and blood of the three patients were identical with that obtained from the doctor's throat. Not only so but during her brief illness at home Mrs. J.S. was attended by her sister Mrs. G. and this woman developed a severe tonsillitis on the day following the removal of Mrs. J.S. The tonsillitis was followed by an acute otitis, and from the pus a hæmolytic streptococcus serologically identical with the other strains was also cultured."

Dr. Dora C. Colebrook in her Medical Research Council report on the "Source of Infection in Puerperal Fever Due to Hæmolytic Streptococci 1935" states: "It may . . . be said that the available evidence to date all goes to show that the human respiratory passages constitute the only important stronghold of these strains of hæmolytic streptococci which are capable of initiating severe puerperal infection". She believes that she is understating the case in saying that in 85 per cent of hæmolytic streptococcal puerperal infections the source of the infection can be traced to carriers or persons with infection in the respiratory passages.

Here, then, we have a very definite fact. How can we make use of it in the prevention of puerperal infection? Theoretically and ideally, what we should do is to take cultures from the noses and the throats of every individual—professional and lay—who is likely to come in contact with the patient at the end of pregnancy, in labour, or in the early puerperium, and banish from her presence during these times all those whose cultures show a Group A hæmolytic streptococcus. At the present time that is an impractical measure. It is practical, however, to have cultures taken at regular intervals of doctors, nurses, students, and attendants who are attached to obstetrical services in hospitals and to exclude such as are carriers from attendance on patients until they are free of organisms. We do just that in the Sloane Hospital for Women. Every pupil nurse and every student has a nose and throat culture taken before coming on service and the whole staff is cultured at intervals. These intervals are more frequent in the winter than in the summer months, for it is in the winter and in the early spring months that most positive cultures are obtained. All carriers are excluded. Two negative cultures, at three-day intervals, are necessary before the individual is reinstated on service. Even with such a check-up we cannot be sure that a carrier is not present and, therefore, every one in attendance upon a woman in labour or in the puerperium must have the mouth and the nose properly masked. An efficient mask should consist of at least four thicknesses of gauze or should consist of a layer of cellophane or waxed paper between layers of gauze. It should be sufficiently deep to cover completely both mouth and nose. The nose is most important as the streptococcus is frequently recovered from it when it is absent from the

throat. It shocks one's surgical sensibilities to see a person wearing a mask which barely hides the upper lip. As soon as a mask gets moist it must be discarded for a fresh one and, of course, it must never be reversed. It may seem unnecessary to mention such details, but is it not a fact that masking is often perfunctory? It is only the realization of the great risk we subject our patient to, if we are not properly masked, that will make us scrupulous in its use. That realization we now have. The mask must be worn by every nurse who approaches the patient in labour, by every doctor who examines her—even abdominally—and by every nurse who does a dressing or cares for her in any way during the early puerperium, for I believe that the streptococcus is not infrequently implanted into the vagina in the early puerperium. This is the irreducible minimum of precaution which should be taken by every one in attendance upon the parturient and puerperal woman.

And it must be remembered that the patient herself may have a streptococcus hæmolyticus Group A in her throat or nose. Ideally, therefore, every patient should have a nose and throat culture just prior to labour. Practically this is not possible at the present time. Also it is not practical with the type of mask available to keep our patients masked all through labour. But if she has had a quinsy, head cold or other respiratory infection, or if she has been in contact at home with members of her family suffering from such, cultures should be made. If cultures are positive, she should be masked during labour. We recall a case of fatal streptococcal septicæmia in a patient coming from a home in which two of her children had septic throats. There are other such cases in the literature. If the patient has a positive culture it is important to warn her against putting the fingers near the genitals, to have her hands washed frequently during labour, and to forbid the use of an ordinary handkerchief, for it is generally conceded that if uterine infection does occur as the result of the presence of streptococci in the respiratory passages of the patient herself the organisms reach the genital passages by contact and not by the blood stream.

Let me sum up this aspect of the subject by stating categorically that I believe that the main cause of hæmolytic streptococcal puerperal infection is the spraying of the organisms from the nose and throat on hands, gloves, instruments, utensils, and dressings which come in contact with the patient, and that the only effective safeguard we have at present is complete masking.

We used to believe that streptococci had a very short life outside the host. In the Sloane Hospital epidemic in 1927 we exposed culture plates in the rooms of infected patients and took cultures from floors, walls, and bedding, and never recovered the organisms. We, therefore, concluded that the organisms did not survive for long. Last year Dr. Elizabeth White, working with Dr. Colebrook in Queen Charlotte's Hospital, London, published a most important paper (*Lancet,* April 25, 1936) in which she states that the hæmolytic streptococcus can be recovered from the dust of rooms occupied by infected persons and that the organisms may survive for a considerable length of time. The difference between Dr. White's technique and ours was that whilst the plates were exposed in Dr. White's experiment the rooms were swept and that the first incubation of the plates was done anaerobically. With this technique she was able to culture on the plates so exposed streptococci serologically identical with those of the patient. Furthermore, in one instance the person who swept the room developed an acute pharyngitis due to a streptococcus serologically identical with that recovered from the dust and from the patient. Here, then, is scientific proof of what we have long known to be true, namely, that it is dangerous to put a clean case into a room or in an environment recently occupied by an infected patient. Charles White of Manchester, England, in his treatise on "The Management of Pregnant and Lying-In Women", published in 1773, discussing childbed fever emphasized the need of ventilation, clean rooms, clean linen, the isolation of patients in separate rooms in hospitals and the immediate removal of patients with the disease from those unaffected. After a patient with fever left the room all bedding and curtains were to be washed and the floor and woodwork cleansed with vinegar. That was written nearly one hundred and fifty years ago, and we still find today women being confined under conditions very little different from those against which White inveighed.

With the increasing use of analgesia and anæsthesia, and with the increase in operative delivery, more and more patients are being

delivered in hospitals and fewer and fewer in their own homes. This I believe is all to the good provided the hospitals are properly planned and efficiently conducted. If they are not they may be the most dangerous places possible in which to put a parturient or puerperal woman. The small hospital or sanatorium which admits all sorts of cases, medical, surgical, obstetrical with no special section for the latter, with no delivery room apart from the surgical operating room, with no isolation unit, with no one in absolute authority to lay down rules and regulations, is a menace in a community so far as obstetrical patients are concerned. It may go along for years without disaster but disaster may occur at any time. It is far safer to deliver a patient at home than in such a place.

An obstetrical hospital should be a separate building or, if part of a general hospital, should be structurally separated from the rest, with a separate nursing and housekeeping staff. The delivery rooms should be for deliveries only. There should be available rooms in which infected patients can be isolated and these should be serviced in such a way that there is no mixing of nursing utensils, bedding, or food with those used by well patients. Rooms occupied by infected patients must not be used by others without thorough disinfection.

All this was said one hundred and fifty years ago, simply as the result of conjecture. Today we have the underlying scientific facts and yet we are remiss in their application. Most of us detest fussiness, and cannot bring ourselves to carry out small details of which we do not see the immediate need. But this question of the planning and running of an obstetrical hospital or of an obstetrical unit in a general hospital is a very practical problem and one that can be solved very easily by the application of common sense to the scientific facts at our disposal.

Let us now turn to the second of the two important varieties of infection which we mentioned at the beginning, namely, that due to anaerobic streptococci. As long ago as 1893 Veillon described an organism which he designated the *micrococcus fœtidus,* and in 1895 Kroenig demonstrated in the vagina of pregnant women and in the lochia of patients with puerperal fever an anaerobic streptococcus. Later, in 1910, Schottmuller described an anaerobic organism which he called the *streptococcus putridus,* which caused an infection characterized by extreme putrescence of the lochia. Later work has shown that there are other varieties of these anaerobic organisms, some of which in their growth in devitalized tissue produce foul gases and some of which do not. Some have the morphological characteristics of the aerobic streptococcus, and some occur singly and not in chains, some are smaller in size, but all are characterized by the fact that they do not grow in the presence of oxygen. Most of them are non-hæmolytic but some are hæmolytic.

These organisms exist as saprophytes in the vagina and under ordinary circumstances are non-pathogenic or are possessed of a very low pathogenicity. Under certain conditions however they acquire virulence and may cause mild infections characterized by profuse fetid lochia, a low-grade fever lasting a few days, and a soft, tender subinvoluted uterus; or they may cause a more serious infection with thrombo-phlebitis of the pelvic veins and a remittent fever lasting over a considerable time; or again they may grow in the blood stream, producing a true septicæmia. In former years we were often puzzled by the fact that in some obvious clinical cases of fatal puerperal septicæmia we could not culture organisms from the blood. The reason was that the cultures were made only aerobically. Now, it should be a routine to make all cultures both aerobically and anaerobically. We shall then find that the infecting organism is an anaerobic streptococcus in some instances, more especially in cases of septic abortion.

What means have we at our disposal to minimize the risk of infection by these organisms? As they are saprophytic in the vagina the answer would seem to be; kill them there before the onset or during the course of the labour. Various attempts have been made to do this by the application of a great variety of vaginal antiseptics introduced as douches or as topical applications. One of the longest and most impressive investigations along these lines has been conducted in the Long Island College Hospital in Brooklyn by Mays and his colleagues. After the routine was established of instilling a solution of mercurochrome into the vagina of every patient in labour, the deaths from sepsis were reduced from 17 to 9 per 5,000 and the morbidity was correspondingly diminished. Whether this reduction was mainly due to the technique adopted or not is a matter for debate. Mercurochrome is after all a very weak antiseptic.

Colebrook carried out experiments on five women, using mercurochrome and other antiseptics, checking the bacterial content of the vagina before, during, and after the treatment.

> "These five records show that the genital tract was not sterilized in any instance, following the repeated application of mercurochrome, crystal violet and brilliant green, or dettol. In two cases there were approximately as many organisms grown three hours after the first treatment as before. In all probability this failure is attributable to multiplication of the bacteria somewhere, perhaps in the glands of the cervical canal, out of reach of the antiseptic.
>
> "The outstanding feature of the results is that in four of the five cases the bacterial species originally present, species believed to be of little or no pathogenicity, were replaced or joined by other species of definitely greater pathogenicity, *e.g., B. coli, B. proteus,* hæmolytic staphylococcus, and fæcal streptococcus. It would seem probable that the introduction of the chemical agent had so altered the mucosal cells or their secretions as to permit these species, which are not normally present, to establish themselves.
>
> "Although the number of cases is admittedly small this investigation suggests the tentative conclusion that it is inadvisable to attempt to improve upon Nature's arrangements for keeping the genital tract free from pathogenic bacteria."

With this conclusion I am in accord and believe that we must rely on other measures to minimize the risk of this autogenous type of infection of which we are now speaking. These measures are directed towards the avoidance of every procedure which will result in contusions and lacerations with devitalization of tissue, for it is in such tissues that these organisms grow and may acquire virulence. It is the long exhausting labour with much operative manipulation which predisposes to this type of infection.

It has been stated that the forceps operation is responsible for many cases of sepsis. This is undoubtedly true, but the statement requires modification, for other factors have to be taken into consideration. In a consecutive series of 500 forceps deliveries, and in a similar series of spontaneous deliveries in the Sloane Hospital for Women, we found that the morbidity rate of the former was 11.6 per cent, and of the latter 8 per cent. On analyzing the cases further it was shown that the average length of labour was ten hours more, and the interval between rupture of the membranes and delivery eight hours more in the forceps than in the spontaneous cases. Lacerations of the pelvic floor or vagina occurred in 89 per cent of the forceps, and in 50 per cent of the normal cases. We are inclined to think that the two factors of prolonged labour and of trauma are more important than the actual operative procedure. Those two factors are most frequently present in the high and medium forceps deliveries. The low forceps operation, if aseptically and skilfully performed, does not add to the risk of the mother, but any operation other than this does. High and mid-forceps operations should, therefore, be reserved for cases absolutely demanding them and should not be used "prophylactically". When once the necessity for a forceps delivery is evident, and conditions are such that it can be performed, every hour of delay adds to the risk. As a further proof that instrumentation in itself is not responsible for a high incidence of sepsis I quote the morbidity rates in private and in ward patients in the Sloane Hospital. In the former the morbidity rate was 8 per cent with a forceps incidence of 45 per cent. In the latter, *i.e.,* ward patients, the morbidity rate was 17 per cent, and the forceps incidence only 19 per cent. In comparing these two classes of patients other factors must, of course, be taken into account, but the figures are striking and must make us doubt that judicious minor operative interference *per se* is an important factor in puerperal morbidity.

Deep anæsthesia which prolongs labour and increases blood loss post-partum is, on the other hand, a predisposing factor in puerperal infection, as borne out by our Sloane records.

Prophylaxis against this type of infection boils down to the proper management of pregnancy and labour. Proper pre-natal care will bring the patient to labour in the best possible physical condition. Pre-natal examinations will enable us to form a prognosis as to the probable course of labour and to plan for the type of delivery. The conservation of the patient's strength by light nourishment and above all the maintenance of body fluid in long labours are most important. When operative procedures such as forceps or version are definitely indicated they should be done as soon as conditions are optimum. A timely episiotomy is less hazardous than an irregular contused laceration. Naturally the skilful operator who handles instruments and tissues gently will get better results than one who is less skilled. We can never get away from this personal factor. The skilled obstetrician is he who knows when to let Nature take her course and when to interfere. In interfering he does so at the proper time and with the greatest gentleness and manipulative skill. He conserves his patient's strength and guards her against excessive loss of blood. Such a one will have few cases of anaerobic streptococcal infection.

What I have said regarding the prevention of these two main types of infection all sounds absolutely commonplace, and I have used up practically all of my time in expounding what you may regard as the obvious. But I offer no apology, for prevention is the crux of the problem and all of us have hitherto failed in greater or in lesser measure in making it effective.

Little time remains for a discussion of treatment when infection is definitely present. We are all thrilled by the results so far reported from the new drug sulfanilamide. This is the non-proprietory name officially adopted by the Council on Pharmacy and Chemistry of the American Medical Association for the chemical substance para-amino-benzene-sulfanamide. The drug as first used in Europe was a red dye, prontosil. The active part of this so far as antibacterial action is concerned is sulfanilamide. This part contains none of the dye. One firm markets it under the name prontylin and other firms under various other designations. It would seem best to use the one name, sulfanilamide. This drug can be administered either by mouth in the form of tablets or in solution intravenously. The former is the method recommended, the latter only being used in cases where oral administration is impossible on account of nausea or in cases in which a large initial dose would seem to be indicated. When administered by mouth the quantity given should be from 3 to 5 grams each twenty-four hours in divided doses.

Let me say at the outset that I have had no personal experience in its use in puerperal infection, for it so happens that we have not had a single case of infection with a Group A beta-hæmolytic streptococcus since the drug came upon the market. We do not flatter ourselves that this is due entirely to the precautions we take against its entry into our patients; other factors probably play a large part, the most important of which may be the epidemiological one. There is evidence that the prevalence of streptococcal infections in general and the virulence of the organisms vary from year to year in very much the same way as with influenza. It would appear that this is not a "streptococcal year" in New York for I learn from my colleagues in other hospitals that their incidence of infections is also low. We have not used it in other types of infection, for the many studies that are being made throughout the world indicate that it is against hæmolytic streptococcus alone that sulfanilamide is effective. In the study going on in the Presbyterian Hospital of New York, with which the Sloane Hospital is associated, this is borne out. There may be an exception in the case of some meningococcal and gonococcal infections, but on the non-hæmolytic streptococcus and the anaerobic streptococcus it seems to have no effect. In the coming year we shall doubtless learn much more about the drug. Meantime a word of caution is in order. Sulfanilamide is not without toxic action and should not be given indiscriminately in every case of puerperal infection. The indication should be the recovery of the Group A streptococcus from the cervix or the blood. Until bacteriological diagnosis can be definitely established it may be given to cases which clinically appear to be infections of this type, but should be discontinued if they prove otherwise.

We have no specific for the treatment of anaerobic infections and must rely on general measures, especially on blood transfusions to sustain the strength and increase the resistance of the patient. I mentioned that it is especially in cases of incomplete septic abortion that the anaerobic streptococcus is found. There is increasing clinical evidence that the removal of necrotic débris from the uterus of such cases, provided it is done with the utmost gentleness, shortens the disease and expedites convalescence. When the infecting organism is the aerobic hæmolytic streptococcus, I believe that what has been taught for many years is still true, *viz.*: that any intrauterine manipulation is attended with a grave risk of causing generalized lymphatic or blood spread. So, even if we may now have a drug which is almost a specific against one type of puerperal infection, the old truth holds "Prevention is better than cure".

ACUTE INTESTINAL OBSTRUCTION—APPENDICEAL

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THIS title might be acute obstruction of the appendix or acute appendiceal obstruction. The condition has been named by Wilkie "acute appendicular obstruction". It is my endeavour to get away from the term "appendicitis", so that there will be no confusion between this condition and acute primary (inflammatory) appendicitis or true appendicitis. Let us keep in mind that the suffix "itis"—means inflammation. It seems ridiculous to apply the same term to two absolutely different pathological conditions simply because they occur in the same organ. One would not think of calling diphtheritic infection of the tonsils, tonsillitis. Obstruction of the appendix in its acute form is just as dangerous comparatively as diphtheria is in relation to ordinary inflammatory tonsillitis. In a recent article by Priestley and McCormack[3] entitled "General peritonitis secondary to rupture of the appendix" they say, "Clinically and pathologically the significance of Wilkie's differentiation of the two important types of appendicitis has probably not been sufficiently appreciated. Wilkie emphasizes the distinction between 'acute appendicitis' and 'acute appendicular obstruction'. The former condition is primarily an inflammation of the wall of the appendix without initial obstruction of the lumen. This type of appendicitis is usually gradual in onset, less rapid in its course, and less likely to progress to gangrene and rupture than is the obstructive type." (The obstructive type is not appendicitis.) They go on to enlarge upon obstruction of the appendix, and then say that in any discussion of appendicitis an accurate definition of terms and grouping of cases is essential. They append one reference to an article by Wilkie in their long bibliography. In their classification and grouping there is no mention whatever of "acute appendicular obstruction" or acute intestinal obstruction—appendicular. All of which confirms the suggestion which they make themselves that Wilkie's work has "not been sufficiently appreciated". I wrote to Priestley along this line and in his reply he says: "I realize from your letter we did not stress the differential signs and symptoms of these two types of conditions adequately".

Wondering how widely the point in question was appreciated and taught, I wrote the following letter to the surgical department of nine medical schools: "I am interested in the extent of the application of Sir David Wilkie's teaching, which differentiates between primary inflammation of the appendix and primary obstruction of the appendix. It will be appreciated if you would return to me answers to two questions: (1) Does your school of medicine teach Wilkie's differentiation in appendicular disease? (2) Is such teaching emphasized as being important and life-saving?" These schools were equally divided between Canada, the United States and Great Britain. Those in the United States were, one on the Atlantic coast, one in the central region and one on the Pacific coast. In Great Britain, one in London, one in the provinces and one in Scotland. Replies by return mail were received from all except one of the Canadian schools. As most of these were of a personal nature and no good can arise from quoting names and places such details will be omitted. The replies were as follows.

CANADA

1. Both questions in the negative, with this note. "I find it impossible to be certain of the condition by clinical signs. Importance to life must depend on perforation and peritonitis after it."

2. "I am afraid I cannot give an adequate answer to your questions in regard to appendicitis without writing a paper. However, my answer to the first question is: (*a*) Does you school of medicine teach Wilkie's differentiation in appendicular disease? *No.* (*b*) Is such teaching emphasized as being important and life-saving? *No.* We agree with Wilkie that a perforation which is frequently the result of an obstruction is very serious because it bursts into an open peritoneal cavity.

UNITED STATES

1. East. Question No. 1: yes. Question No. 2: important, yes. Life-saving, no.

2. Central. "We do appreciate and teach Dr. Wilkie's differentiation between primary inflammation and primary obstruction of the appendix. We perhaps do not lay as much stress on the distinction as he does simply because of our belief that every patient in whom a diagnosis of appendicitis can be made should be operated upon at the earliest possible moment. We would not *willingly* temporize in any case."

3. West. "No great effort is made here to distinguish between primary inflammation of the appendix and primary obstruction of the appendix. We feel

that either condition should be considered as an acute surgical condition and the earliest possible removal of the appendix advised. *We have naturally observed that those patients having a large single fecolith are much more apt to perforate the appendix early than the kind which has diffuse inflammation throughout the appendix itself.*''

GREAT BRITAIN

1. London. ''We are quite certain of the difference of the two varieties and have had specimens illustrating acute obstruction of the appendix and have taught the different clinical divisions long, long before Wilkie made his great discovery, and we have always laid stress on the fact that *those with the symptoms of obstruction must be operated upon at once.*'' (This is particularly interesting as a prominent graduate of this school most definitely does not subscribe to this teaching.)

2. English provinces. ''I can tell you that both answers, in *my* teaching, are *yes*. In this school, however, we must have at least twenty surgeons and whether they would all subscribe to that answer I do not know.''

3. Scotland. ''It is quite impossible, in my view,—nor, indeed, is it desirable,—to give simple affirmative or negative answers to either of the two questions which you put to me. As regards the first question I have to say that, while we recognize here the value of Wilkie's work in connection with the differentiation of cases of appendicitis, we do not agree that any hard and fast line can be laid down as between non-obstructive and primarily obstructive appendix lesions. As in so many other conditions, so also here, there are wide variations, which are recognizable histologically and often clinically. Unfortunately, the two do not always coincide.

''As regards the second question, we still find the difficulties that others find in differentiating clinically between certain types of appendicitis; and while in many cases we feel that we can, with a certain degree of assurance, differentiate between urgent and non-urgent cases, we still encounter the occasional case in which the clinical evidences appear much less decisively urgent than one would have expected from the operative findings. *We do, however, recognize that the obstructive appendix lesion is the one to be feared beyond most, if not all, others.*''

We therefore have the score for and against as follows.

	For	*Against*
Canada	..	2 (no answer from one)
United States ...	2	1
Great Britain ...	3	0

I have asked graduates of the missing Canadian school if they were instructed on this point. The answer was in the negative. We can list all three Canadian schools in the ''against'' column on the information available.

Holder and Wells[2] in a recent article entitled ''Survey of appendicitis in San Diego'' ignore ''obstruction of the appendix''. They endeavour to explain massive gangrene in atypical cases on a circulatory basis. I have checked the majority of the references given in their article and several other such articles appearing in the recent literature and have failed to find, either in the body of the script, or in the references given any mention of Wilkie or obstruction of the appendix. Many of the authors of these papers are either graduates of or on the staff of the medical schools canvassed in the above survey. It would therefore appear evident that by and large acute obstruction of the appendix, as an entity, is being ignored in Canada and the United States at least and Wilkie's remarkable contribution is not bearing the fruit it deserves.

There is a general admission that the mortality from ''acute appendicitis'' is not decreasing. I feel that one is perfectly sound in saying that it is on the increase. The mortality figures seem to have been analyzed from almost every conceivable angle, such as age, sex, time and type of operation, incision, anæsthetic, administration of cathartics (even the kind of drug administered), relation to intake of food, to the rising and the setting of the sun, the season of the year and so forth, but no one except Wilkie seems to have given any great thought to what, to me, appears the true crux of the situation.

The last word, as it were, as given in an editorial by F. Gregory Connell[1] is ''After these exclusions — of chronic, acute, non-perforated and perforated with abscess—there remains the type of appendicitis in which the mortality rate is high (24 to 40 per cent) and the treatment of which calls loudly for improvement.'' I am firmly of the opinion that this highly mortal type is ''intestinal obstruction—appendiceal'' or, as Wilkie termed it, ''acute appendicular obstruction''. Connell also says in the same editorial:—''To enhance the value of 'statistics' and to simplify the study of mortality rates, it might be advisable to subdivide the subject of appendicitis as follows.

Appendicitis
- non-operative treatment
- operative treatment
  - chronic
  - acute
    - non-perforated
    - perforated
      - abscess
      - peritonitis
        - local
        - diffuse.''

Again we see no suggestion of the gravest form of appendicular disease—acute obstruction.

To segregate the obstructive lesions the following subdivision is suggested.

- Acute appendicular disease
  - primary inflammatory
    - non-purulent
    - purulent
      - abscess formations
      - general peritonitis
  - primary obstructive
    - localized by early operation
    - generalized by rupture
      - treated by immediate operation
      - treated expectantly

It must be understood that acute obstruction may be superimposed upon acute inflammation. When this occurs the character of the pain changes, becomes more severe and cramp-like. Not only does the character of the pain change, but also, and emphatically, the character of the attitude of the attendant must change to one of urgent speed in removing the obstructed organ.

Infected thrombosis of the veins draining the cæcal region, *i.e.*, the superior mesenteric vein, throws an entirely different consideration into the picture, and it would be well to segregate these cases independent of whether their origin be in obstruction or inflammation of the appendix. Multiple chills, either pre- or post-operative, are the warning in this condition, and the treatment is ligature of the infected vein above the limit of thrombosis. The portal pyæmia, which produces the chills, is thus controlled.

Wilkie[4] says in his original article on this subject, "If we set out by recognizing two definite types of acute disease of the appendix—namely acute inflammation and acute obstruction —then not only does the understanding and the teaching of symptomatology of acute appendicular disease become much more simplified, but the early diagnosis of such disease becomes invariably more confident and more correct".

What are the differences between these two conditions? Acute inflammation is the same here as in any other location. It arrives as the legitimate heir to the throne accompanied by heralds and trumpets; elevation of pulse and temperature from the beginning. The patient is acutely ill, as with any inflammatory disease. The pain is not acute nor cramp-like. But not so with obstruction; it is as the usurper approaching stealthfully, makes no commotion, there is no elevation of pulse and temperature, no leucocytosis, no turmoil, until the damage is done. A snake in the grass that strikes quickly and venomously. The pain is acute and cramp-like.

One can say that in acute inflammatory appendicitis there is practically no danger to life, and that operation *may* be done safely and sensibly at any time, late or early. This is because the inflamed organ becomes thoroughly walled off by the protective processes going on within the abdominal cavity, and at worst a localized abscess occurs. (It is understood delay is not counselled.) Not so in acute appendicular obstruction. It is not an inflammatory process; the protective mechanism of the abdominal cavity is not warned and so does not bring its forces into action. The result is that when the appendix bursts the contained infection is spread broadcast in the peritoneal cavity. There is only one time at which to operate, and that is before the symptoms of "appendicitis" appear, that is before inflammation occurs.

The sequence of events in acute obstruction of the appendix is as follows:—the lumen of the organ becomes shut off from the lumen of the bowel. According to the amount of bacteria and fermentative material contained in the appendix, distal to the obstruction, there will be varying degrees and speed of fermentation and distension of this portion. There is peristaltic effort on the part of the appendix to expel the contents, and pain typical of an obstructive intestinal lesion occurs, *i.e.*, cramps accompanied by reflex irritation of the rest of the gastro-intestinal tract, evidenced by nausea, vomiting and movement of the bowel, either singly or in association.

The most common source of obstruction is the fæcolith, which is nothing more than a bit of inspissated fæces which has been compressed and moulded by the persistent and repeated peristaltic efforts of the appendix to force the material beyond an isthmus in its lumen. This isthmus may be the normal narrowing at the outlet which we frequently see in the appendix, or a stricture due to fibrosis or kinking, or perhaps the pressure of a band of adhesions. This explains why my correspondent from the Pacific coast observed that cases with large single fæcoliths are much more apt to perforate early.

The fæcolith may be forced on into the cæcum or may drop back into the appendix, and so the attack of obstruction passes off and the patient recovers. But if the obstruction is not relieved the distension of the appendix shuts off the blood supply, the part of the organ distal to the

obstruction dies, peristalsis ceases, and so does pain; so also, the nausea and vomiting. There is little or no elevation of pulse or temperature and the leucocyte count shows little or no change from normal. On physical examination about all that can be found locally is a most circumscribed area of tenderness over the appendix, with perhaps some muscular rigidity. This latter may be very very slight, if not absent. Slight or absent rigidity is particularly common in children. Given a patient presenting this picture, I am sure that from the viewpoint of "appendicitis" no one could do any more than suggest that perhaps it would be a safe thing to have the appendix removed. Humanity being as it is, one could only expect a very few patients to consent to operation under the circumstances, while, as a matter of fact, this is the time that the patient should be told that he is in grave danger and that an operation done immediately is absolutely urgent. Appendectomy can be done at this stage without any fear of complications and there is no need of drainage. Diagnosis depends on the immediate history and local signs.

Following this stage a sign develops which I have found of great help in confirming the stand of urging immediate operation; this sign is seen in the uppermost part of the gastro-intestinal tract. The breath is becoming a bit foul, the tongue and mucous membrane of the mouth drying, and the throat parched. This can be best illustrated by referring to an example.

A confrère at his summer cottage complained of abdominal cramps, nausea and vomiting and diarrhœa, beginning early in the morning. There were a number of other medical men summering close by. Several of them came to his assistance. His temperature and pulse were watched, a blood count was done, and after an all-day worry on the part of the whole group the pain ceased and all was quiet. Everybody, including the patient, went to sleep deciding he "had eaten something", but not before his physician father, who was some two hundred miles away, had been notified. The elder doctor started for home as soon as possible, arrived during the late evening, and asked me to drive out to the summer colony and see his son. On arrival I had some little difficulty in awakening the household, and I really believe that the good man's wife resented my disturbing their rest after such a trying day. Being admitted to the patient's bedroom, the peculiar foul odour of his breath was evident. He had then been free from pain for some three or four hours and sleeping quietly. There was slight elevation of temperature, little or no increase in pulse rate. On examining the abdomen there was slight rigidity and a small area of intense tenderness on deep pressure over the cæcal region. After a bit of persuasion he was on his way to the hospital in the back of my car, but, in spite of all haste, operation revealed obstruction of the appendix and extensive gangrene. Recovery was uneventful, but had he gone until morning things might have been vastly different.

This appendix, like many others in the obstructive group, was retrocæcal and in these cases local tenderness is the more difficult to elicit early and rigidity slight or absent till rupture. The same applies to an appendix located low in the pelvis. In such cases rectal or vaginal examination is absolutely necessary and should be carried out not only early but frequently, and until the diagnosis has been made.

The first responsibility for the recognition of obstruction rests with the family medical attendant, then with the surgeon. If either be called regarding a patient who complains of severe abdominal pain in either the umbilical or cæcal region, either intermittent or continuous with periodic acute spasms, acute obstruction of the appendix must be suspected. Diagnosis of obstruction (before rupture) demands immediate operation. If the pain is periodic and local tenderness not definite one may leave to return in not more than two hours. During the interval *no medication* of any kind should be given—*certainly no cathartic and no analgesic; nothing* should be allowed by mouth, not even a swallow of water. Perhaps a hot-water bottle might be prescribed to ease the mind of the family. The obstruction may be overcome as previously outlined, or fermentation within the closed lumen may be slight or absent. On second examination, should pain not have occurred and local tenderness cannot be elicited either from in front, in the loin, or by the pelvic route, small amounts of water are permissible, and a recheck in two hours, with definite instructions that should there be a return of pain or any other symptom of obstruction this be notified at once. Should one be consulted a bit later when there has been an exudate of infective material through the damaged wall of the appendix there will be more signs of local peritonitis and operation is urgent.

Should the evidences be those of an already ruptured appendix the advisability of operation is perhaps doubtful. If early after the rupture, operation *may* be life-saving and must be considered most seriously. Later, when there is a diffuse peritonitis, it would seem that we *may* have reached the point where it is "too late for the early operation" and expectant treatment *may* give better results. In very late neglected cases—delay for localization is advisable.

Until some such classification as the above has been adhered to through several long series of cases one cannot hope to come to a definite conclusion as to the value of the late, early operation for acute obstruction of the appendix. It is doubtful if there ever can be any definite generalization on this point. But it is definite now that if obstruction of that part of the intestinal canal known as the appendix is treated by removal before there is rupture the mortality from acute appendicular disease will be greatly reduced.

I quote Wilkie verbatim on this point.

"This is a very fatal form of intestinal obstruction, because it is of the closed-loop variety which tends to early gangrene. If we would but realize that a sudden and complete obstruction of the lumen of an appendix containing fæcal matter will, from the pressure of the decomposing content, inevitably lead to tension gangrene within six to twenty-four hours, and that gangrene will be followed by perforation, with the escape of stinking fæcal content into the free and unprepared peritoneal cavity, we would regard the recognition of the onset of such an obstruction as one of the most important and responsible duties of a medical practitioner."

He makes a point of the drawn, anxious facies in diagnosis, and says the patient is usually conscious that there is something wrong inside and welcomes the suggestion of an operation. Certainly, I have noted how quickly some people jump at the proposal for operation in this condition. My impression is that they are not the great majority.

A great deal has been written on the influence on the mortality of the various types of anæsthesia and the location of the incision. I do not feel that these are of any major consequence, though I personally rather prefer spinal anæsthesia[10] and a modified McBurney incision, as described in a previous article.[9]

In conclusion, the following points are stressed.

1. Sir David Wilkie's original articles, as listed in the references, should be carefully studied.

2. Acute disease of the appendix should be conceived of as being firstly, inflammatory, and, secondly, obstructive.

3. In all appendicular cases a persistent effort should be made to differentiate between these two types of condition, clinically and pathologically.

4. Obstruction of the appendix should be looked upon as a true type of intestinal obstruction and not as an inflammatory disease of the appendix.

5. In the future the analyses of appendiceal mortality should be made under these two heads.

6. When intestinal obstruction — appendiceal is suspected immediate appendectomy should be urged and the patient warned of the tremendous danger in delay.

If such be our attitude in the future the very fine contribution to our knowledge made by Wilkie more than twenty-three years ago should bear fruit, and the mortality rate in appendiceal disease should show a progressive decrease rather than a progressive increase.

NOTE.—In this number of the *Journal* there appears an editorial by Dr. Edward Archibald, Professor of Surgery at McGill University. This completes the replies to my questionnaire. The editorial speaks for itself. I greatly appreciate the time and thought that Dr. Archibald has given to this matter.

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SULPHANILAMIDE IN CEREBROSPINAL FEVER.—R. Tiffeneau and J. J. Meyer state that sulphanilamide is not only an effective drug in the prevention and treatment of streptococcal infections, but also in various other infections, such as those caused by the meningococcus, pneumococcus, gonococcus, *B. coli*, and *B. typhosus*. Intrathecal injection is unnecessary in cerebrospinal fever, and the dosage by the mouth should be some 6 g. every twenty-four hours, an initial dose of 3 g. being followed twelve hours later by 1.5 g., which is then given every six hours. When the temperature has fallen, the meningeal signs have disappeared, and the cerebrospinal fluid has become normal the daily dose should be reduced to 3 or 4 g. In the infant the daily dose should not exceed 2 g. In most cases of cerebrospinal fever administration of sulphanilamide by mouth is sufficient to effect a cure in from one to three days. In severe forms serum treatment is also indicated.—*Paris méd.*, September 18, 1937, p. 215. Abs. in *Brit. M. J.*

CLINICAL ASPECTS OF PRÆCORDIAL PAIN*

BY W. FORD CONNELL

Kingston

PAIN arising anywhere near that region of the body in which the heart is situated is apt to give rise to much more anxiety and concern than is warranted by the severity of the symptom. The reason is obvious. Yet it is the commonest of clinical experiences to find that the most anxious patient, with the most obvious præcordial pain, is suffering from no form of organic heart disease and is in no danger whatever of dying, while another with the most trifling symptoms, which he is diffident to mention and inclined to dismiss as of no importance, is being afflicted by that syndrome so much feared by the first class of patient — angina pectoris.

This rather hackneyed subject has been chosen for discussion because it does not as yet seem to be generally realized that the great majority of all cases in which there is complaint of pain in the front of the chest can be adequately diagnosed and treated without recourse to other than the most ordinary methods of physical examination, combined, not with any complicated laboratory or instrumental procedures but, and this is important, *with a most painstaking history-taking.*

Most of the patients I see with pain in the front of the chest or thereabouts are sent to me because it is considered possible that the symptoms complained of are cardiac in origin. Of the last 166 such cases seen in the past year nearly one-third had no discoverable form of organic heart disease, nor was any other satisfactory organic cause found for their pain. This group, whose pain is definitely *not* imaginary, but of psychogenic origin — is naturally extremely important. It will be discussed under the general heading of neurocirculatory asthenia.

The other most important causes of pain in this region of the body were angina pectoris, accounting for some 38 per cent of the cases, and coronary thrombosis—10 per cent seen in acute attacks, and a further 10 per cent seen with angina, but with definite evidence from history and electrocardiogram of old thrombosis. Chronic disease of the gall bladder was quite an important group, constituting 8.4 per cent and introducing one of our most difficult differential diagnostic problems. Only 5 per cent of the cases fell into other than the above categories, the pain being due to secondary malignancy, intercostal neuritis, syphilitic aortitis, etc.

We shall get farthest in the short time at our disposal if we first of all tackle angina pectoris and state concisely when it may definitely be said *from the history alone* that a patient has angina, and when it may just as definitely be said that he is *not* suffering from this important syndrome. A patient has angina if, being over the age of 50 and a male, he comes complaining of an uncomfortable sense of constriction or tightness, felt beneath the mid-sternum or slightly to the left of this point, provoked by definite effort, particularly following meals, and often accompanied or relieved by the belching of gas. The constriction may grow into an intense gripping or burning pain, and may radiate widely to one or both shoulders, arms, up into the neck, jaw, or behind the ears, or down into the epigastrium. It is of only a few minutes' duration, and is relieved by rest and by nitroglycerin. The diagnosis may even be angina if our patient is a female, but usually only if she also has some degree of hypertension. Hypertension may be present in the male anginal subject too, but in the female, in whom angina is only one-fourth as common, it is almost invariable.

Our patient has angina, given the above history, even if on physical examination the cardiovascular system is entirely negative. It is usual, in fact, to find a heart normal in size or only slightly enlarged, whose sounds and rhythm are normal, and which may even, in nearly one-third of cases, give a normal electrocardiographic curve. Since the symptoms that constitute angina invariably reflect a condition

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Medicine, June 23, 1937.

of relative cardiac bloodlessness, developing under varying degrees of cardiac work, it is common to find evidence of generalized arteriosclerosis, reflecting the coronary narrowing which is the essential underlying pathological basis. If the coronary sclerosis is of conspicuous degree it may produce rather characteristic changes in the electrocardiogram, but it will not commonly give rise to enlargement of the heart unless associated with other causes of enlargement, such as high blood pressure or aortic insufficiency. This latter condition, when marked, is particularly prone to induce angina, sometimes of extreme degree, since it gives rise to unusually low diastolic pressure in the aorta, and it is during diastole that the coronaries fill.

It is to be remembered always that angina pectoris is not a single clear-cut disease but is a well-defined group of symptoms, arising whenever a sufficient degree of bloodlessness is induced in the heart muscle or some part of it by a suitable combination of circumstances. In severe anæmia, for example, even with slight coronary narrowing, the degree of anoxæmia may be sufficient to produce severe angina, which may entirely subside following anti-anæmia therapy. Hyperthyroidism is another condition tending to greatly aggravate or precipitate any slight tendency towards angina already present. Moreover, this condition in older persons is often most atypical and will only be recognized if the possibility is constantly borne in mind in every case of angina. Once recognized, its radical treatment may cause an entire subsidence of the cardiac symptoms.

At this point it should be noted that the nervous make-up of the individual patient has much to do with the ease with which he develops angina. A phlegmatic person may have most extreme coronary disease and yet complain of apparently trifling symptoms; others may have a highly sensitive nervous mechanism which responds with hair-trigger delicacy at the first appearance of relative cardiac ischæmia. The assessment of the part played by the nervous factor in each case is most important when it comes to prognosis and to treatment.

Before we consider the negative side of our diagnostic problem it would seem wise to discuss briefly the picture which follows on coronary thrombosis—the syndrome of cardiac infarction. Most victims of coronary thrombosis have had angina pectoris, although it may have been overlooked, or labelled as "indigestion". Occasionally, an attack of thrombosis may come "out of the blue" and this is especially true of younger patients, in a certain proportion of whom the etiology is infection rather than degeneration. We may generalize that cardiac infarction is rare under 40, and is most likely to occur in males over 50, as does angina. It is remarkably rare in patients with rheumatic endocarditis or aortic syphilis. Since arteriosclerosis is the basic predisposing lesion, we will be able to demonstrate a greater or less degree of this in nearly all cases. The familial tendency to arteriosclerosis and cardiovascular disease in general is most striking, both in our cases of angina and coronary thrombosis.

High blood pressure is the rule in the patients who develop thrombosis, there being invariably a sudden and sustained drop with the occurrence of the attack.

The typical picture following cardiac infarction consists in the onset, usually during rest, sometimes *following* a period of heavy exertion or excitement, of pain which commences, like the angina of effort, as a sense of substernal oppression which usually grows to agonizing intensity. This pain may radiate as does angina. It differs, however, in its onset during rest and in its long duration, lasting with continuous unfluctuating severity for 10 to 12 hours, unless dulled by morphine. The clinical picture is characterized by two other features besides the pain—*dyspnœa* and *shock*. The dyspnœa is the result of the insult to the heart as a whole. The signs of cardiac embarrassment may sometimes dominate the picture, there being at times sudden and fatal pulmonary œdema, or, more usually, the slow onset of congestive heart failure. The patient presents the usual features of shock, either mild or severe. The pulse may become quite impalpable, and the patient may become pale, cyanotic, cold and clammy. In a few hours, if he survives, his temperature rises, and there is quite a marked leucocytosis. A pericardial friction rub may be audible. The cardiac rhythm is usually unaltered, although gallop rhythm is not infrequent; the pulse usually quickens, but sometimes may slow strikingly.

This is the typical picture. Many patients die instantly following thrombosis, without developing any of these symptoms. Some die in

a few hours, or days, or may succumb to complications, embolic or otherwise, in the second week. A surprising number survive even really severe attacks, to make at times an excellent recovery. We are only now beginning to realize how very many do make a good come-back (nearly 80 per cent in fact) with the increasing frequency of diagnosis of the mild and atypical cases. In this work the electrocardiograph plays a most important part, and at times is indispensable.

The cases which give difficulty are, first, those in whom the symptoms are so mild as to be overlooked and for whom no doctor is called, and, secondly, those in which pain is quite absent or is atypically situated. When pain is absent the syndrome consists of a picture of shock and dyspnœa (for example, the sudden onset of an attack of acute pulmonary œdema). When the pain is atypical an acute abdominal disaster is most often simulated by the sudden onset of epigastric pain, with upper abdominal rigidity, vomiting, collapse, rapid small pulse, fever and leucocytosis. One of the most valuable differential points is the presence of dyspnœa, which is uncommonly found in abdominal lesions. The previous history is of vital importance here, too.

We have now briefly surveyed the manner in which angina and coronary thrombosis may present themselves. When can we be reasonably certain from the symptomatology that we are not dealing with these rather grave conditions?

Continuous dull, præcordial ache can and does occur following coronary thrombosis, but it is much commoner in other conditions. It signifies an exceptional degree of heart consciousness. It may be present following, as has been noted, a severe coronary occlusion, and patients dying of hypertensive heart failure often complain of this symptom. Its commonest clinical association is neuro-circulatory asthenia.

Pain felt in the region of the apex beat—left submammary pain, is practically *never* angina—particularly if it is described as being sharp and stabbing or neuralgic in character. It too is typical of neuro-circulatory asthenia. Even if it radiates to the left arm this should not mislead us. It is true that this is the commonest radiation of true anginal pain but it is nearly as common with pain of psychogenic origin. Pain produced during exertion is not angina, if it can be shown that only certain exertions involving twisting movements of spine or trunk, or of the left arm produce it. Such pain is obviously of somatic origin—due to spondylitis, intercostal neuritis, myositis, etc.

Pain which suggests gall-bladder disease (either gall-stone colic or suppurative cholecystitis) may indeed be cardiac, probably not angina, more likely coronary thrombosis. Patients with undoubted gall-bladder involvement do have attacks of coronary thrombosis far too frequently for the association to be coincidental. I can only advise an open mind in all such cases, both cardiac and gall-bladder diagnoses being considered.

Many other conditions may superficially simulate angina or coronary thrombosis. I have even known a broken rib to do so. Aortic syphilis is one disease which should be mentioned. In addition to its propensity to induce typical anginal seizures through the involvement of the mouths of the coronary arteries it possesses a characteristic pain of its own, dull, nagging, nocturnal pain of a distensive or neuralgic type, due apparently to stretching of the nerve endings in the aortic wall.

Neuro-circulatory asthenia is a very real entity, with very real pain; it made up the bulk of those cases which in the war were tagged D.A.H., and it is just as common in civil life as it was then, perhaps more so. Some might prefer to call it the "effort syndrome", and recently an English writer, rightly revolting from the term "pseudoangina", has used what seems to me a scarcely less objectionable term to describe it—"angina innocens". It is much commoner in females than in males and the age group affected is on the average 15 or 20 years younger than those with angina. This syndrome is essentially just a part of the neurasthenic reaction which may develop whenever environmental difficulties are met with. Substantially, as the result of the development of a state of nervous tension, the individual loses his sense of well-being, becomes fatigued, and becomes intensely conscious of the functioning of one or more of his organs. In many, probably due to some individual difference in make-up, the predominant symptoms are those of heart consciousness.

Three chief symptoms are complained of—*palpitation, præcordial pain* and *breathlessness.* The palpitation is merely an intense awareness

of the normal but over-acting heart, responding excessively to all stimuli. The pain complained of is usually more or less localized in the left submammary region; it is often a dull steady ache, which the patient tries to relieve by pressure or rubbing, despite the fact that there is nearly always an area of intense tenderness about the centre of the aching area, (which it is important to elicit on examination). The ache may last for days at a time and is supplemented by sharp stabs which often radiate down the left arm. Associated are many other nervous symptoms—dizziness, headaches, numbness, hot flushes, etc. Breathlessness is an invariable complaint. On analysis, this consists merely of intense consciousness of the normal respiratory act, and a feeling as though not enough air were being obtained. The patient seeks relief therefrom by frequent deep, sighing respirations, (the hall-mark of the neurasthenic). Sometimes the sense of suffocation is acute and the patient may rush out of doors and may breathe for a few minutes with quick panting respirations. There is never orthopnœa or cyanosis.

While the majority of patients exhibiting this syndrome are found on examination to be completely free of organic disease, there is nothing to prevent a patient with any type of organic cardiac disease developing this symptom-complex in addition to whatever signs or symptoms his organic disability has produced. Finally, it is not at all uncommon to find essential hypertension associated with neuro-circulatory asthenia, and of course these patients, after, as it were, "crying wolf" for twenty years or more may eventually develop serious myocardial impairment.

I cannot discuss treatment here. I can only plead that an essential pre-requisite to successful therapy is complete and certain diagnosis. The physician must be confident, and the patient must know that the physician is confident, of the nature of the symptoms complained of. If the patient has angina I do not believe in lying to him. It may not always be necessary or desirable to label his condition bluntly, but it is possible to discuss with him, frankly but tactfully, the nature of his condition, and to give him faith, hope and encouragement, while at the same time telling him enough so that he can best avoid attacks and prolong his life. Remember that the prognosis in angina is often infinitely better than may seem possible, and much better certainly than was taught a few years ago; so never give a bad prognosis to the patient. It may make him much worse, or, on the other hand, he may get better in spite of it and confound your judgment.

If the patient has not angina it is usually possible to be sure of this by careful history and physical examination alone. Sometimes, it is worth while, for your own and the patient's satisfaction, to supplement clinical judgment with electrocardiographic and radiological study. Granted you are dealing with a case of neuro-circulatory asthenia, a few hours spent in searching examination, followed by complete and unhurried explanation and reassurance, will do more for your patient, and, incidentally, for your reputation as a physician, than all the medicines in the pharmacopœia.

PREVENTION OF POST-OPERATIVE THROMBOSIS.—C. Crafoord administered heparin post-operatively to counteract a tendency to thrombosis. In the first series of cases it was found that this treatment prolonged the time of coagulation and also increased the tendency to bleeding in the area of operation. The substantial fall in blood pressure, the increase in the pulse rate, and the rise in temperature which were observed in several cases may have been due to the large doses of heparin, especially as some of the preparations used were of a relatively low degree of activity. It was decided to postpone further experiments until preparations of 100 per cent activity were procurable. In the second series of cases, in which the preparations used were of a uniform degree of purity and strength, there were no post-operative signs of toxicity. It was found that the doses had less effect administered post-operatively than in normal cases. In order to eliminate the risk of bleeding the first dose was not given until three hours after operation, but, as in two cases small subcutaneous hæmatomata were formed, it is proposed to lengthen still further the interval between the end of the operation and the first administration of heparin. No signs of post-operative thrombosis or embolic complications were observed in any of the cases, not even in one in which thrombosis had occurred after both a previous delivery and an operation. Although the results have so far been satisfactory, it is considered necessary to try this treatment in a larger number of cases before any definite conclusions regarding its usefulness can be drawn.—*Acta chir. scand.*, 1937, **79:** 5, p. 407. Abs. in *Brit. M. J.*

GASTRO-INTESTINAL HÆMORRHAGE*

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THE object of this paper is to emphasize once more the seriousness of gastro-intestinal hæmorrhage, and to call attention to a comparatively new and somewhat revolutionary form of treatment. The sudden loss of a large quantity of blood, whether from the gastro-intestinal tract or from the lungs, constitutes one of medicine's major catastrophes, and as such demands frequent and serious consideration in such meetings as this.

The causes of gastro-intestinal hæmorrhage, apart from blood dyscrasias, are the same as the causes of hæmorrhage elsewhere in the body, and are due to the erosion and opening of a blood vessel secondary to a definite ulcerative process. Since ulcerative lesions of the gastro-intestinal tract are most frequently found at or near the pylorus any discussion of gastro-intestinal hæmorrhage must be concerned largely with gastro-duodenal lesions. The next most frequent site of gastro-intestinal ulceration is in the lower small intestine and the colon. We will limit our discussion to gastro-duodenal lesions.

The character and the extent of the hæmorrhage may vary all the way from a slow constant oozing to a sudden severe loss of blood which almost completely exsanguinates the patient. The hæmorrhage may be a single one or may recur every few days. The severity of the hæmorrhage will vary according to whether it is coming from an artery, a vein, or a capillary. The size of the vessel itself and the presence or absence of blood dyscrasias will also influence the extent of the loss of blood. The age of the patient is an important factor, as shown by the fact that in young, healthy adults the normal elasticity of the vessel walls will tend to stop the flow of blood, while in the aged in whom the vessels are sclerosed and their normal elasticity has been lost they will tend to remain open and so favour the continuance of the hæmorrhage. The size of the lesion itself does not bear much relationship to the amount of blood lost; small ulcers sometimes prove fatal, while certain large ulcers cause very little or no bleeding.

The hæmorrhage, if it occurs high in the gastro-intestinal tract and is gross in character, will practically always be vomited; if it is slight in amount it may be wholly retained and passed as melæna. Blood appearing in the intestinal tract distal to the first few inches of the duodenum is practically always retained and passed as melæna. The question of vomiting or not vomiting the blood is unimportant, and does not in any way detract from the seriousness of the condition. The vomiting of blood, however, does give some visible idea of the amount of blood lost, and is a valuable aid in persuading the patient to seek the aid of his physician.

Considering a patient who has vomited a large quantity of blood, the pertinent question arises, where did it come from? Not all vomited blood has its origin in the stomach or duodenum. At times, relatively unimportant causes, such as epistaxis or a bleeding tooth, or blood from the nasopharynx or larynx may account for the presence of blood in the stomach. Blood escaping from the trachea or lungs may be unknowingly swallowed, only to be vomited or passed as melæna later. Excluding such extraneous causes of bleeding as the above, the great majority of cases of gross hæmorrhage will be found to be due to intrinsic gastro-duodenal ulceration, either acute or chronic. The next most frequent cause is cirrhosis of the liver with splenic anæmia or Banti's disease.

In a study, published in 1932, of 668 consecutive cases of patients who came to the Mayo Clinic because of hæmatemesis, the relative frequency of the lesions responsible was as follows: (1) intrinsic gastro-duodenal lesions 90.5 per cent; (2) cirrhosis of liver with splenic anæmia or Banti's disease 5.1 per cent; (3) all other causes 4.4 per cent.

INTRINSIC GASTRO-DUODENAL LESIONS

Bleeding from gastro-duodenal lesions may be due to any of the following causes.

Trauma.—A blow to the abdomen may injure the walls of the stomach or duodenum and cause

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Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Medicine, Ottawa, June 23, 1937.

a hæmorrhage, especially if an ulcer is already present. Swallowed articles, such as glass, nails, pieces of metal, may erode the mucosa and produce bleeding.

Chronic gastric, duodenal and gastro-jejunal ulcer.—Because of the greater incidence of duodenal than of gastric or gastro-jejunal ulceration duodenal ulcer becomes the most frequent cause of high gastro-intestinal hæmorrhage. More than 50 per cent of the total number of patients coming to the Mayo Clinic on account of hæmatemesis had duodenal ulcers. These ulcers are usually old, chronic, indurated ones with thickened edges, and may bleed from erosion of a fairly good-sized vessel, usually in the base of the ulcer, or there may be a slow oozing from the congested area surrounding the active ulcer, or the bleeding may occur from the breaking-off of granulation tissue during the healing of the ulcer. This type of bleeding may be mere oozing or it may be sudden and profuse.

Although gastric ulcer is much less frequent than duodenal, the bleeding is of essentially the same character as that which occurs in the duodenum, and clinical differentiation is often impossible. Occasionally (in 2 to 3 per cent) following gastro-enterostomy intended to cure ulcer of the stomach or duodenum, a reactivation of the old ulcer may occur, or a new ulcer may develop at the new opening. Ulcers in both of these locations seem to have a marked tendency to bleed.

Gastro-duodenal ulcers usually manifest themselves by a train of dyspepsia symptoms extending over a period of months or years. Such cases are fairly common, and practically in 100 per cent a certain amount of bleeding occurs at some time during the course of the disease, but only a small percentage ever bleed to an alarming degree. Hæmorrhage, however, may be the first symptom of a so-called "silent" duodenal ulcer, and Mayo Clinic statistics show that 8 per cent of ulcers have hæmorrhage as the first symptom to attract the patient's attention. As an example of this latter type of case, I shall relate briefly a case history.

CASE 1

G.B., male, 26 years of age, single, clerk, first consulted me on June 9, 1936, complaining that on the evening previous, while coming home from a summer resort, where he had gone in his usual health, and in company with some friends, he was seized with abdominal pain and cramps, nausea, vomiting and diarrhœa, and that he had fainted. This was an entirely new experience for him, and he attributed it to some Hamburg sandwiches and pop which he had eaten before coming home. None of his friends, however, were similarly affected. There was no previous history of dyspepsia nor any other indication of serious systemic disease. Physical examination failed to reveal the presence of pain, soreness, tenderness or rigidity of the abdomen. The patient was given an alkaline mixture and sent to bed. Next day he felt all right; he had no more diarrhœa, and felt he could go to work the following day. I saw no more of him until after the next week-end, when he went to visit a friend, who happened to be a laboratory technician in a small hospital. She, being alarmed at his pallor, did a blood count which showed a Hgb. of 45 per cent and 3,400,000 red blood cells. These findings were confirmed, and as the patient was working and felt well, he continued to do so. He was advised to stay on a soft, non-roughage diet, and to take some iron by the mouth. His strength and vitality quickly returned, and I saw no more of him until four months later (October 15, 1936), when he came in again saying that on the previous night he had passed a large black stool, and he felt a little dizzy and weak. From stool tests, the blood count, and his history it was evident that he had suffered another hæmorrhage, even in spite of the fact that he still had no stomach complaints whatever. An x-ray examination taken at that time failed to reveal any definite disease, and the evidence for definite ulcer was inconclusive. The patient was put to bed in the hospital, and after a week returned to his home in another city. Further x-ray examinations at a later date failed to reveal where the bleeding came from. He is now back working and feeling well.

While we lack definite x-ray confirmation of an ulcer in his case, clinically he has to be regarded as having a bleeding ulcer and must govern himself accordingly.

Gastritis, duodenitis, mucosal erosion, acute ulceration.—Single or multiple areas of acute inflammatory reaction in the mucous membrane of the stomach or duodenum without definite evidence of a break in the mucous membrane may be the cause of gastro-duodenal hæmorrhage. The relationship of these acute inflammatory areas to chronic ulcer is not understood, but they do seem to have a definite relationship to acute ulceration. Small inflammatory areas become denuded of mucous membrane, and as several such areas coalesce an acute superficial ulcer may be formed. The bleeding from such areas is usually of a slow oozing type and rarely becomes gross in character. Such bleeding, however, may become very serious because of its slow insidious character and long continued duration.

Carcinoma of stomach.—Practically all carcinomas of the stomach bleed at some time during the course of the disease. Such bleeding is usually slight and rarely gross in extent. If excessive hæmorrhage occurs it is usually the result of a direct ulceration into a large-sized vessel by the growth and is frequently part of a terminal picture. The bleeding in cases of

gastric cancer is usually the result of ulceration of the wall of the stomach or of necrosis and sloughing of papillary growths.

Other types of malignant growths may be the cause of severe bleeding, as shown by the following.

CASE 2

G.D., male, aged 53 years, was first seen in August, 1935, for an acute bronchitis. An analysis of the blood at that time revealed Hgb. of 70 per cent and 4,900,000 red blood cells.

He was seen again in January, 1936, at which time he complained of marked weakness, and loss of strength and endurance. He gave a history of dyspepsia after eating for the previous twelve years, with no adequate attempt at medical or dietary control. He had never vomited. Shortly before admission he had been having tarry stools, and his sisters remarked on his increasing pallor. Physical examination showed a marked pallor, a large nodular enlargement of the thyroid gland, and a rough systolic murmur at the apex. Laboratory examination showed Hgb. of 35 per cent and red blood cell count of 2,900,000. The stools gave a persistently positive test for blood. Gastric analysis showed a total acidity of 25 and a free HCl acid content of 11 after histamine stimulation; there was no evidence of blood in the gastric content. X-ray examination suggested an indefinite lesion, thought to be either a polyp or a diverticulum in the prepyloric region of the stomach. There was no gastric retention. The patient was given a blood transfusion and advised to return in a week for another.

Before the week was up he had another severe hæmorrhage and returned to the hospital. Examination then showed Hgb. of 30 per cent and a red blood cell count of 2,200,000. The patient was given seven blood transfusions during the next eighteen days and then explored surgically. At operation a diffuse, trabeculated, infiltrating mass was found in the plyoric end of the stomach which on removal and section proved to be a lymphosarcoma.* Recovery was uneventful and he continues to be in good health.

Benign tumours of stomach and duodenum.— Benign tumours of the stomach constitute less than 0.5 per cent of all stomach tumours. They are usually polypoid in nature, and may be the cause of severe anæmia due to prolonged loss of blood. If of sufficient size they will be demonstrable by x-ray examination as a filling defect in the lumen of the stomach. Pathologically, they are usually fibroadenomas, fibromyomas, myomas or hæmangiomas.

Other less frequent causes of gastro-duodenal hæmorrhage are such conditions as tuberculous and luetic ulceration, rupture of œsophageal or stomach varices, congestion of the circulation secondary to heart disease. Hæmorrhage from cholecystitis or appendicitis probably never occurs *per se*, but such conditions may act as foci of infection for hæmorrhagic lesions occurring in the gastro-duodenal area.

* This case will be fully reported at a later date.

MORTALITY

True mortality rates in bleeding ulcer are hard to determine. Among the mass of statistics now available the following from England may be quoted: Hurst (1924), about 4 per cent; Bulmer (1932), 10 per cent; Chisman (1932), 25 per cent. From the United States, Goldman (1936) reports a total mortality of gross hæmorrhage from peptic ulcer to be 15 per cent; Ledbetter reports the same figure.

Another series of cases analyzed by Aitken (1934) from the London Hospital gives a considerably more serious picture than do the above statistics. From this series of 255 cases 27, or 11 per cent, died of exsanguination. Considering the whole series such a mortality rate does not seem particularly serious, but, as he points out, in many of the cases the hæmorrhage was not of sufficient severity to greatly endanger the patient's life. If the mortality figures, therefore, are restricted to those cases which were considered grave and in which the patient's life seemed endangered, he found that 27 out of 63, or 43 per cent died. His classification of what constituted a grave case was purely clinical, and was restricted to those cases having Hgb. of 20 per cent or less and a red blood cell count of 2,000,000 cells or less. While this is an arbitrarily-set division of cases, it nevertheless gives a more accurate picture of the true severity and seriousness of gross and severe hæmorrhage than is found in other reports.

TREATMENT

There is no absolute uniformity in the management of gastro-duodenal hæmorrhage, whether it be hæmatemesis or melæna. This is probably due to the fact that no one individual has had the opportunity of comparing any large series of cases under different types of management.

Treatment of the case that has slight bleeding or only oozing does not present a serious problem, and many recover without any special measures or even without medical supervision. The cases of severe or repeated hæmorrhage, however, are problems reaching the proportions of a major catastrophe and cannot be passed over lightly. These are cases that are represented by the 43 per cent mortality rate in Aitken's series; these are the cases that break up your night's rest and turn your hair grey.

The generally accepted medical regimen for bleeding ulcer is absolute bed rest, with plenty

of morphine and atropine to keep the patient quiet, and relax any muscular spasm which may be present. From this point on the treatment varies. Some authorities advise absolutely nothing by mouth for two to five days while others allow only small, scanty feedings of soft bland non-irritating foods, such as cream of wheat, milk and cream, and custards. Following this starvation period the diet is very slowly and carefully and gradually increased in amount and variety over a period of several weeks, during which time the patient continues not only to be exhausted from his gross loss of blood but is actually kept in this exhausted state by a starvation type of medical regimen. Theoretically, this starvation treatment aims to abolish all peristaltic waves in the stomach, but we have no physiological confirmation that any such idea is in reality correct. From a practical standpoint the mere presence of blood, a protein substance, in the stomach, will be a stimulus for digestion and peristaltic movement. Similarly with the use of alkalies. If alkalies are of any use, and most physicians believe they are, in neutralizing the acid stomach content of an ordinary peptic ulcer, why should a patient be penalized by withholding them just because his ulcer is bleeding?

As a result of the above arguments certain changes in the treatment of patients with gross hæmorrhage seemed inevitable, and in 1933 Meulengracht, of Copenhagen, reported the results he had obtained in treating hæmatemesis and melæna by giving his patients something to eat, *i.e.*, a varied diet from the first day and plenty of it. The reasons which led him to do this were as follows: (1) that exhausted patients often died following hæmorrhage, in spite of the starvation treatment and scrupulous dieting; (2) that sometimes patients with protracted hæmorrhage stopped bleeding when they were given food; (3) that very often ambulatory patients recovered from severe melæna without making any particular change in their diet at all. Again in 1935, in *The Lancet,* he reports the results of his "treatment with food" of a series of 286 cases of gross hæmatemesis and melæna. Of these 251 were considered to be due to gastro-duodenal ulcers. Among these 251 patients there were only 3 deaths, one being due to perforation with general peritonitis, one to profuse hæmorrhage seventeen days after starting treatment; and one died before "treatment with food" had been instituted. If the last case be omitted, this gives a mortality rate of only 1 per cent, the lowest mortality rate on record. He then compares this mortality rate with a similar series of cases treated in another hospital in Copenhagen on the usual orthodox starvation treatment, where there were 22 deaths, or a mortality rate of 7.9 per cent in 289 patients. He further states "This radical change in mortality brought about by 'treatment with food' is due to something beyond its effect on the hæmorrhage itself. For my experience is that patients with hæmatemesis and melæna do not usually die until 8 days after hæmorrhage begins. Thus in my opinion they do not die directly from loss of blood, but rather from general exhaustion, often with complications. This exhaustion is no doubt primarily the result of their anæmic condition, but it is accentuated by the extreme insufficiency of food and drink with which they are supplied at this critical moment. To me this is the explanation why with 'treatment with food' we get a mortality so much lower, for, instead of weakening the patient still more, we are giving him support when he badly needs it."

This treatment consists in giving the patients a full purée diet, together with one teaspoonful three times daily of a mixture of sodium bicarbonate and magnesium subcarbonate 15 g. each, and hyoscyamus extract, 2 g.; also ferrous lactate 0.5 g. three times daily. The purée diet includes at 6.00 a.m. tea, white bread and butter; at 9.00 a.m. oatmeal with milk, white bread and butter; at 1.00 p.m. dinner; at 3.00 p.m. cocoa, and at 6.00 p.m. white bread and butter, sliced meats, cheese and tea. The dinner includes a variety of dishes, such as meat balls, broiled chops, omelet, fish balls, vegetable, meat or fish, mashed potatoes, vegetable purées and soups, cream of vegetables, stewed apricots, apple sauce, gruel, and rice and tapioca puddings. The food is puréed, and the patients are allowed to have as much as they want.

Before leaving the subject of treatment, blood transfusions and surgical procedures must be considered. Blood transfusions are useful, and often life-saving in severe cases. They can be repeated regularly every twenty-four hours or as necessary according to the severity and frequency of the bleeding. They not only replenish blood lost by an exhausted patient but also

supply certain coagulating elements which have become depleted by the frequent hæmorrhage.

Surgical procedures, when done, should aim to find and control the bleeding point. Any attempt to correct the pathological process which produced the original ulcer should be delayed until a later date, when the patient has recovered from his hæmorrhage. Such procedures in patients who have had frequent severe hæmorrhages are undertaken with considerable reluctance by most surgeons, because of the risk involved in operating upon a patient already *in extremis*. The problem often is made even worse by not knowing the exact location of the bleeding point. The patient, however, who only has an occasional hæmorrhage should be advised of the possibility and seriousness of repeated hæmorrhages, and urged to have a surgical attack made on the bleeding area between periods of gross hæmorrhage.

Briefly we may summarize the treatment of hæmatemesis as follows.

1. In the less severe cases; ordinary medical regimen.

2. In grave cases; medical regimen, morphine, transfusions.

3. If bleeding continues we may have to resort to surgery in spite of the risk involved.

4. In the patient who bleeds only occasionally; medical regimen for the hæmorrhage, and surgical attack upon the ulcer between periods of bleeding.

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ANÆSTHETIC PROCEDURES AS STANDARDIZED FOR CERTAIN TYPES OF OPERATION IN A LARGE GENERAL HOSPITAL*

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IN any large hospital staffed by experienced anæsthetists and equipped with modern anæsthetic appliances there are a number of factors which influence the anæsthetist in his choice of an anæsthetic agent or method. Complicating states in the patient to be operated upon, individual preferences on the part of the patient, surgeon or anæsthetist, the cost of the drug, are conditions which must be reckoned with in this selection. In teaching hospitals the necessity of instructing the beginners in anæsthesia in the fundamentals of the science to some extent limits the choice. The varying influence of these and perhaps other factors undoubtedly effects differences of technique in various institutions and localities. In our anæsthetic service it has happened in the course of time, sometimes after trial and error, that for certain operations some particular agent or technique appeared to be the most advantageous in the conditions surrounding our group. It is probable that a similar situation has developed in other groups. In view of the constant interchange of ideas in this connection between hospital anæsthetic staffs in different localities and of the value to be gained therefrom, the writer ventures to record the various techniques employed at the moment in the hospital with which he is connected.

Neurological surgery.—Some of our techniques have been established after various searchings for the most suitable method, and in no instance, perhaps, is this better exemplified than in the case of neurological operations, the majority of which are carried out under general anæsthesia. For several years these cases were given insufflation of ether by the endotracheal route with fairly good results. There were, however, occasions on which, when the position of the head was changed during the operative procedure, the airway was disturbed, with the inevitable consequence of congestion and bleeding. In succession, rectal ether and tribromethanol were employed and the combination of each of

* A paper read at the Sixty-eighth Annual Meeting, Canadian Medical Association, Section of Anæsthesia, Ottawa, on June 23, 1937.

these with local infiltration of procaine. Due to the rather wide variation in the effects of these drugs in different individuals, difficulty was experienced sometimes in maintaining the desired level of anæsthesia for the length of time that some of these operations require. For the past two years or so we have been using ether with a Magill endotracheal catheter inserted when the patient is anæsthetized to a point at which coughing or straining does not result, the anæsthesia being then maintained by means of a motor-driven vaporizer. There is no direct connection between the catheter and the delivery tube from the machine, the ether vapour being blown beneath a mask covering the end of the tube. Change of the position of the head does not affect the airway. It is felt that with a motor-driven vaporizer a lighter level of anæsthesia may be maintained than is possible by dropping ether on the mask. In any case these patients recover consciousness quickly, even when the anæsthesia lasts for three hours or more. An effort is made, of course, to induce anæsthesia without excitement, chloroform being used, if necessary, to promote this end. The neurological staff believe this method to be the most satisfactory that we have yet used. For encephalography tribromethanol is employed for those patients not sufficiently cooperative for a local anæsthesia.

Surgery of the head and neck.—For other operations about the head and for block dissection of the glands of the neck this same procedure proves satisfactory. Frequently, however, we use endotracheal insufflation of ether as one has access to the patient if the airway tends to become obstructed. In private patients and in others when specially indicated the endotracheal administration of cyclopropane replaces the more unpleasant ether. Some use is also made of the endopharyngeal administration of this gas, for which purpose the Leech or the Shipway airway is employed.

Thyroid surgery.—In operations upon the thyroid gland, nitrous oxide, being the least toxic, is the anæsthetic of choice. We give enough preliminary sedative to ensure at least a quiet patient. As soon as the patient is anæsthetized a combination of thyroid nerve block and local infiltration is effected by the surgeon, with the result that, except when traction is being exerted upon the gland itself, frequently analgesia is all that is necessary. It is believed that under these conditions, interference with the recurrent laryngeal nerve is more easily recognized. Cyclopropane is reserved for those patients not easily handled in this manner, but it is felt to be less suitable than nitrous oxide because of the possible danger of initiating cardiac fibrillation in the thyrotoxic patient, the certainty of more bleeding, the high incidence of post-operative retching, and the undesirable depth of anæsthesia that is almost certain to follow.

Thoracic surgery.—Before the introduction of cyclopropane spinal anæsthesia with procain was the method of procedure in thoracoplasty involving the lower chest. In view of the higher percentages of oxygen permissible when cyclopropane is used, this anæsthetic seems specially indicated in these cases, complicated, as they frequently are, by low vital capacity. It is our choice at the moment.

In pulmono-lobectomy for bronchiectasis we employ spinal anæsthesia when the middle and lower lobes are in question, and have done so for several years. Because many of these patients were in more or less advanced stages of the disease, and as a consequence not good risks for an inhalation anæsthetic we believe our choice of spinal anæsthesia to be sound. In these cases we prefer procaine to nupercaine, the only other drug much used for spinal anæsthesia on the service, because with the former, in contrast to nupercaine, the preponderant effect falls on the sensory rather than the motor roots. The average dose is 250 mg. dissolved in 10 c.c. of spinal fluid placed in the third or fourth lumbar interspace. A review of this work has been published.[1] Since the introduction of cyclopropane most intra-pleural operations for conditions other than bronchiectasis are managed with this drug rather than with the sub-dural block formerly employed. For pneumonectomy and lobectomy for bronchiectasis involving the upper chest the same anæsthetic is used. In these patients the endotracheal technique is always followed. For this purpose we employ the largest catheter that can be conveniently passed through the glottis after it is fitted with a Guedel-Waters cuff. It is imperative in these operations to acquire the complete control of respiration which a closed system furnishes. The larger

catheter insures an easy airway and facilitates the removal of embarrassing secretions.

Abdominal surgery.—Some six or seven years ago sub-dural block anæsthesia replaced ether in most of our abdominal work. For some time procaine was used almost entirely. In upper abdominal work we were driven to large dosage, as much as 350 mg. being used for gastric resections, in an attempt to procure sufficient length of effect. For the past three years we have used nupercaine, 1:1,500 solution, by a technique following closely that of Howard Jones,[2] and have found it to give greater satisfaction to the surgeon and to the anæsthetist alike. We believe that this drug, when used for spinal anæsthesia, has several distinct advantages over procaine. After an extensive trial it is our opinion that there is definitely less circulatory depression, as evidenced by blood pressure and pulse reading, and less change in colour than is the case when large amounts of procaine are used. Further, because of the preponderant effect on motor rather than on sensory roots cyclopropane supplementary anæsthesia will maintain good relaxation as late as 2½ or even 3 hours from the time the anæsthetic is injected, should the patient experience pain during the later stages of the operation. We can produce anæsthesia of 1½ to 2 hours' duration in most cases without the necessity of supplementation by other anæsthetics. In upwards of 80 per cent of all cholecystectomies, common bile duct investigations, and gastric resections which include some risks that cannot be considered first class, our choice is nupercaine spinal anæsthesia. Many of these patients receive from 1,000 to 2,000 c.c. of normal saline by the intravenous drop method in the 24-hour period immediately prior to operation. The poorer risks may be given a blood transfusion before or during the operation. We consider that the extra degree of relaxation obtained by spinal anæsthesia is of distinct advantage to these patients, and that this factor has been responsible to a considerable extent for the lowered operative mortality rate that has been enjoyed in the past several years by our surgical services in this type of surgery. The dosage employed is from 15 to 18 c.c., the larger dose being used in large males in good general condition. The patients are placed in the prone position for about eight minutes with the head of the table elevated about five degrees. A small pillow is inserted beneath the upper chest in order to protect the cervical cord. We believe it important to give enough preliminary sedative to induce light sleep, a combination of morphine, hyoscine and nembutal being used to this end. Few of these patients cause any real concern during the operative period. Epinine, combined with ephedrine, is invariably effective in combating any circulatory depression that may arise. We have had one death on the table with nupercaine, and it is debatable as to whether in the case in question this drug was the chief offender. In the aged and in very poor risks cyclopropane by the endotracheal route is preferred to spinal anæsthesia. In a few cases ether is given, preferably in a closed system.

For other abdominal operations, such as bowel resection, in which the operating time is likely to exceed one hour nupercaine spinal anæsthesia is the usual procedure. For appendectomy, through a gridiron incision, cyclopropane is satisfactory for most patients, spinal anæsthesia with procaine being employed for robust patients or where the patient or surgeon expresses a desire for this anæsthetic. If a patient insists on a general anæsthetic, when complete relaxation is needed, small amounts of nupercaine placed sub-durally materially assist in obtaining this result. Under these circumstances less time is consumed because the prone position is not necessary, and is, in fact, contraindicated.

For pelvic operations on ward patients open ether is used most frequently, spinal anæsthesia with either procaine or nupercaine being reserved for difficult cases. This choice of open ether is dictated chiefly by the fact that these patients seem most suitable for the instruction of the inexperienced intern or student because of the comparative freedom from post-operative respiratory and other complications which they enjoy. Private patients of this nature are given cyclopropane or a spinal anæsthetic depending chiefly on the preference of the patient or surgeon.

Genito-urinary surgery. — For operations on the kidney nupercaine spinal anæsthesia is used in most good risk patients. The anæsthesia is induced with the table level, the side to be operated upon placed uppermost and the patient

left in that position. An average dose of 12 c.c. of the 1:1,500 solution produces satisfactory results. For doubtful and poor-risk patients cyclopropane is substituted. The choice of anæsthetic in patients presenting for supra-pubic prostatectomy is determined chiefly by the age of the patient and the condition of his cardiovascular system. The younger and such older patients as are considered good risks are given spinal anæsthesia with procaine in moderate dosage, about 120 mg. The complete muscular relaxation and the drier field resulting therefrom would seem to warrant this procedure. For more elderly men and those with cardiovascular damage cyclopropane is preferred, as being less dangerous. In longer operations about the bladder nupercaine is preferred to the dosage of procaine necessary to gain sufficient length of operating time.

Transurethral resection of the prostate is frequently carried out with caudal block with metycaine. Thirty-five c.c. of a 1.25 per cent solution in distilled water is effective in many cases, nitrous oxide usually sufficing to complete the anæsthesia in the partial failures. Cyclopropane has been used by some members of the staff, although it is possible that this procedure is not entirely free from the explosion hazard. Moreover, the continuous flow of blood in the field is troublesome. Some surgeons prefer spinal anæsthesia for this purpose, and some of the better-risk patients are handled in this fashion, procaine dissolved in small amounts of spinal fluid being used.

Orthopædic surgery. — For minor operations of this nature cyclopropane has proved to be very useful. In more extensive operations, such as those affecting the hip joint, spinal anæsthesia with nupercaine is mostly used, although it has not yet been established to our satisfaction that the spinal block minimizes surgical shock. Spinal bone graft may be carried out in this fashion. When a patient presents with a vital capacity impaired by scoliosis or other causes it is felt that cyclopropane is the anæsthetic to be desired and the endotracheal technique the most advantageous.

Operations about the anus and perineum.— Caudal block with 30 c.c. of a 2 per cent solution of procaine is used frequently for hæmorrhoidectomy. We prefer metycaine for this purpose, but up to the present time the supply of this drug has been limited. Cyclopropane gives fairly good sphincteric relaxation, and is used when a general anæsthetic is indicated. For operations about the perineum spinal anæsthesia or cyclopropane is chosen, depending chiefly on the preference of the patient or surgeon. The anæsthetic staff has not as yet acquired that skill in effecting transsacral anæsthesia that is necessary if this procedure is to be acceptable to patients and busy surgeons. We readily admit that in many instances this method is highly suitable.

On our service we make little use of tribromethanol, possibly, partly because of the time factor. In plastic operations about the face and in certain eye operations, it has been of particular service.

The appeal to us of the intravenous employment of barbituric acid derivatives has been such that their use is confined chiefly to those cases in which it is inconvenient to give an inhalation anæsthetic. For short operations about the head, some eye operations, and where the use of the cautery or diathermy gives us some concern, evipal and later pentothal have been of real value. Otherwise, we rarely use these drugs.

About the only use we have made of vinyl ether up to the present is as a supplement to cyclopropane, when relaxation with this agent is not readily obtained. Five or six c.c. allowed to evaporate into the circuit seems to be more suitable than ethyl ether for this purpose. We have not as yet noticed any undesirable effects from this combination.

Chloroform alone is used only where a cautery or diathermy is used in the mouth or throat for a longer time than may be obtained with the usual dose of intravenous barbiturates. These patients are induced with nitrous oxide, with some ether and chloroform used to maintain the anæsthesia.

Obstetrical analgesia for ward patients is carried out by interns with a chloroform and ether mixture, nitrous oxide being used only when specially indicated. Nitrous oxide, during contractions at first and later continuously, by the direct flow method rather than closed, is used for private patients. We find cyclopropane to be superior to nitrous oxide for difficult delivery and Cæsarean section.

The anæsthetic staff of our hospital comprises a chief and six assistants, most of the latter not

confining their practice to anæsthesia. We have a resident anæsthetist whose term of service is one year. One intern is assigned to the service each month for instruction. Each final-year student is attached to the service for one week for the same purpose. The members of the anæsthetic staff rotate from month to month on the various surgical services, and each assumes the responsibility of arranging all anæsthetics on his own service. Our hospital has 1,100 beds.

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URTICARIA*

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THERE must be very few persons who reach middle life without experiencing an attack of urticaria or "hives". Usually the cause is quickly ascertained by the patient without recourse to the services of a physician, and by avoiding the offending drug or food or contact no further attack occurs. There remain, however, a residue of people who suffer from it for years, and chronic urticaria is one of the most baffling problems that the physician is called upon to solve, and for the patient one of the most distressing of the common diseases of the skin.

The urticarial lesion is identical with Sir Thomas Lewis's experimental reaction, "the triple response". If the normal skin is firmly stroked there occur in a few seconds: (1) Active local dilation of the capillaries, producing an erythema confined to the line of the stroke. This is independent of innervation. (2) A minute later a more diffuse response due to relaxation of the arterioles surrounding the line of the stroke and visible as a wide flush or "flare". This is brought about through a local nervous reflex. In some persons these are followed by (3) œdema or whealing due to increased permeability of the vessel walls (factitious urticaria or dermographism).

Lewis's work has proved that the triple response is due to some diffusible substance derived from damaged epidermal cells, and there is strong evidence that this substance is histamine. If a drop of diluted histamine be placed on the skin and a prick made through it a perfect triple response is evoked.

The histamine content of the epidermis is 24 mg. per kilo., equal to a solution of one in forty thousand, and capable of evoking a flare and a wheal if pricked into the skin. Injured skin contains the same amount of histamine as normal skin, but in a short time the concentration diminishes, due to absorption into the blood stream, and if the amount so absorbed is adequate there occurs a systemic reaction which is the counterpart of the first stage of Lewis's triple response, a general capillary dilatation accompanied by a marked drop in blood pressure and symptoms of shock.

It sometimes happens that urticaria and shock symptoms occur together, as in experimental anaphylaxis, a reaction which has been proved to be due to the interaction of antigen and cell-fixed antibody. This interaction damages the cells to which the antibody is fixed and histamine or a histamine-like substance is liberated. In a sensitized person a local urticarial response can frequently be evoked by pricking the antigen into the skin, the result being identical with that produced by pricking in histamine. It is quite probable that the majority of cases of urticaria are caused by H-substance liberated from the epidermal cells by the interaction of antigen and antibody; but in many cases the H-substance is liberated from cells damaged by other means such as trauma, heat, cold, insect bites (mosquitos, lice, bed bugs, *Sarcoptes scabiei*), plant and chemical irritants, ultra-violet and other short-wave radiations. In short, any injury to the epidermal cells which results in the liberating of the diffusible histamine-like substance may cause urticaria.

The epidermal cells are not the only ones to which antibody becomes fixed. It is probable that the cells in the superficial part of the dermis are those primarily affected. With an antigen

* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Dermatology, June 24, 1937.

to which a person is known to be sensitive the reaction cannot be evoked by placing it on the surface of the skin, as in the patch test. It must be introduced into the skin so as to come in contact with living epidermal cells in the deeper part of the epidermis or with the cells about the minute vessels in the cutis, and so, as would be expected, in most cases of urticaria the antigen reaches the skin from within.

With a known antigen the Prausnitz-Kuestner reaction (for short called P.K. reaction) is positive. This is an important reaction because most of our knowledge of antigen-antibody interaction is based on it. The test is performed by injecting into the skin of a normal subject a series of dilutions of serum from an allergic individual, and as a control a series of corresponding dilutions of serum from a normal person; the two lines of injection being parallel. Twenty-four hours later the antigen is injected into all the sites, giving a positive reaction in the one line and a negative in the normal control. It has also been found that if the antigen is injected at some distance from the site of the serum injection the reaction occurs just as before, at the site of the serum injection and nowhere else, proving that only traces of antigen are required and also that the antibody remains cell-fixed at the site of injection. Further, if in a case of food allergy the positive serum is injected into the skin of a normal person a wheal will form at the site of the injection within two hours of his eating the specific food. One wheal desensitizes the site, the antibody being neutralized in the interaction with antigen. In the absence of antigen the site remains sensitive for several weeks, the cell-fixed antibody only slowly disappearing.

Heat and cold are recognized but are not common causes of urticaria. I recently saw an example of cold sensitiveness in a girl aged fourteen years. The attacks of urticaria began two years previously and occurred in the winter and only on exposure to cold. She had taken up swimming in a local pool last summer, and on two occasions had fainted shortly after coming out of the water. Horten and Roth[1] have pointed out that collapse while swimming is the most dangerous consequence of hypersensitiveness to cold. The explanation is that cold causes increased permeability of the tissue cells and permits the diffusion of the histamine-like substance, and when there is a sufficient concentration in the general circulation shock symptoms are produced. If this occurs while swimming death is certain unless rescue is effected at once. Of the many drowning accidents occurring every summer in Canada some are undoubtedly attributable to this cause. Fortunately, systemic desensitization to cold can be accomplished by having the patient immerse the hand in ice water for two minutes twice daily for a month. Patients can also be desensitized to cold by the subcutaneous injection of 0.1 mg. of histamine twice daily for two to three weeks.

Acetylcholine is another substance capable of causing vasodilatation. It is known to be set free by the parasympathetic nerves at the periphery and its sudden liberation is probably sometimes the cause of neurogenic urticaria. Emotional stress is a well recognized cause of urticaria, and I recall the case of a woman who developed a generalized attack every time she became angered. This emotion, however, through stimulation of the sympathetic nerves causes a liberation of adrenalin, which is antagonistic to acetylcholine, and urticaria following anger is difficult to explain. Two factors may be involved, anger merely being the spark.

I have recently used acetylcholine successfully in a case of local blanching of the skin. The patient for two years has had an area of skin on the left side of the nose about three-quarters of an inch in diameter, which on exposure to moderate cold and also after briskly rubbing the nose, became blanched as if frozen, the rest of the nose remaining unaffected; this is the opposite to the urticaria reaction. He is now able to restore the blanched area to normal by rubbing into it 2 per cent acetylcholine in a lanolin base.

It is known that protein may pass unchanged through the intestinal villi. Intracutaneous tests with the offending protein are positive. Many times, however, the patient is sensitized not to whole protein but to a product of the digestion of whole protein. This product may be a proteose, a peptone, a peptide, a polypeptide, or even an amino acid, and, of course, skin tests using the mother proteins of these substances are useless. On the other hand, since the number of possible protein derivatives is in the neighbourhood of 100,000, skin testing with them is not practicable.

It is often observed that urticarial attacks frequently coincide with a gastro-intestinal up-

set, and, although difficult of proof, it has been suggested that as a result of abnormal digestion aberrant protein derivatives are formed and it is one or more of these to which some persons become sensitive. Routine fractional gastric analyses in urticaria have been undertaken by various workers, but the results have been somewhat contradictory, probably because only small numbers of tests have been made. Since 1929 fractional gastric analysis has been part of my office routine in all patients with urticaria. One hundred and forty-six such patients have been examined, the duration of the urticaria varying between the extremes of three weeks and fifteen years. The test meal consists of a glassful of water and two arrowroot biscuits. Four specimens are examined, one taken before the meal and three at half-hour intervals after. Free acid is estimated by titrating with decinormal sodium hydroxide solution, using dimethyl as an indicator.

The results are recorded in the following table.

Achlorhydria—No free Hcl.	*Marked hypochlorhydria—Free Hcl. under 20 in all specimens.*	*Slight hypochlorhydria: low normal—Free Hcl. between 20-30.*	*Normal—Free Hcl. 30-50.*	*Hyperchlorhydria—Free Hcl. above 50 in at least one specimen.*
19 cases	41 cases	35 cases	37 cases	14 cases
or 13 per cent	or 28 per cent	or 23.9 per cent	or 25.34 per cent	or 9.58 per cent
	65 per cent			

If we accept 30-50 as normal for free hydrochloric acid it will be seen that 95, or 65 per cent, of the cases in this series have a gastric juice low in hydrochloric acid. Even eliminating the 20-30 group we still have about 41 per cent, with a distinctly low hydrochloric acid content.

The 95 patients were given dilute hydrochloric acid, the amount varying between one and one-half drachms in a glassful of water, with or after meals, and on the whole the clinical results have been encouraging, sometimes dramatic, as the following case notes show.

CASE 1

A female, aged forty, suffered attacks of urticaria almost daily for fifteen years. She had consulted numerous physicians, sometimes travelling to distant places in search of a cure. Appendicectomy and tonsillectomy had been performed. Gastric analysis disclosed a marked hypochlorhydria; two days after taking hydrochloric acid she became free of urticaria for the first time and remained so for five months. Then she went to an Alpine Club camp, three days out from Banff, where she accidentally lost her bottle of acid. The urticaria recurred next day and continued until she got back to a drug store in Banff. For the past five years she has been normal so long as she takes the hydrochloric acid.

CASE 2

A university colleague with severe urticaria for one year and achlorhydria. He was completely cured with hydrochloric acid but dare not go to a dinner party without it.

CASE 3

Giant urticaria, two years; moderate hypochlorhydria, as high as 25 in one specimen. For nearly a year he remained cured with hydrochloric acid, but the condition recurred when the acid was omitted. He was gradually able to reduce the dose, and now is normal without any medicine. Gastric analysis is now normal.

In all, 15 cases, or 10 per cent, have been completely cured with hydrochloric acid alone. Twenty others were not improved. One of these was eventually cured by the removal of a suspicious tooth, another by appendicectomy. Two patients, women in the late forties, were cured with emmenin, drachms one, three times a day by mouth. A few of the remaining patients were lost to observation shortly after starting hydrochloric acid, but the others were all improved in varying degrees. When no further improvement occurred other investigations and other therapeutic methods were adopted.

It should be remembered that there is a strong tendency for the patient eventually to become immunized. Twelve years ago I was consulted by a patient who had urticaria of a few years' duration, and I was unable to find the cause. He moved to Ontario and I lost touch with him until recently, when he wrote in reply to my enquiry that in spite of treatment the urticaria continued for a few years and then gradually subsided, and except for very occasional attacks had not troubled him for the past five years. It is well known that ordinary foods which cause urticaria in childhood eventually immunize the patient, and the same is true of insect bites; people who react violently to mosquito bites eventually become immune.

Although we have a clear understanding of the mechanism of wheal formation the cure of a patient with urticaria depends on our ability to find the cause. The first step is to rule out specific foods, and for this intracutaneous tests are on the whole unsatisfactory. An elimination diet will be found very useful. After a purge the patient is placed on a diet of milk and rice for one week. If the urticarial attacks stop one item of food is added at a time until the urticaria recurs. Then a full diet is gradually resumed, omitting the offending food. If none can be discovered the analysis of the gastric contents, which should be done in the meantime, may disclose an absent or low hydrochloric acid content and the acid with pepsin should be given a long trial. In addition, strict attention should be given to the hygiene of the gastro-intestinal tract. One-tenth of a grain of calomel every two hours, and a small saline each morning, together with colonic lavage, may help. In my experience calcium has not been of much value.

While these measures are going forward a careful examination must be made for foci of infection in the teeth, nose and throat, gall bladder, appendix, prostate, cervix, Fallopian tubes, and so on. If the patient is in the menopause placental extract in the form of emmenin may be given. Anterior pituitary extract may occasionally be useful. Some drugs cause urticaria, but the attacks as in the case of foods are short-lived, the cause being easily detected. Phenolphthalein, barbiturates, salicylates, morphine, iodides, bromides and neo-arsphenamine are among the well known causes, but recently I saw a patient in whom the attack followed the use of sodium morrhuate injections for varicose veins. Prontylin (para-amino-phenyl-sulphonamide) may sensitize the skin to light. Two patients in the Edmonton clinic developed huge urticarial wheals on the hands and face after taking 20 grains of prontylin four times a day for two days. Intestinal parasites, such as tapeworms, should be considered, and if there is any hint of their presence a vermifuge should be given. In this connection it should be remembered that although an eosinophilia is commonly found in the allergic patient it may also be caused by intestinal infestation.

The search for external causes should not be forgotten, especially scabies in a cleanly person, in whom only one or two wheals may be present at a time. Cat hair and other animal contacts have been known to cause urticaria, and more recently dermatophytes have been incriminated. Other contacts to be thought of are cosmetics, mouth washes, douches, nasal sprays, lotions, hair dyes, wool, silk, cotton, inhalent allergens, such as feathers, pollens, ephedrine and house dust. If these and other causes referred to in the early part of the paper can be ruled out non-specific desensitization may be attempted by the intramuscular injection of 10 to 25 c.c. of the patient's whole blood every five days for a month. Plenty of sleep, moderate exercise, and avoidance of mental and emotional stress are important. The psychogenic factor must never be overlooked and may in the end prove to have been the basis of an intractable urticaria.

The main purpose of this paper has been to point out the importance of the oral administration of hydrochloric acid in certain cases of chronic urticaria and to show that in our experience 10 per cent of the patients can be cured by this means alone.

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PITUITARY HORMONES IN SKIN DISEASE. — G. Pighini who had previously shown the close relation between the skin and the neuro-hormonic system especially the hypophysis, records his observations on ten cases of alopecia areata, four of acne vulgaris, and two of acne rosacea treated by intramuscular injections of extract of the anterior lobe of the pituitary. Of the ten cases of alopecia areata seven were completely cured, two showed some improvement and were not followed up, and one showed no change. Two of the cases of acne vulgaris were completely cured and two showed considerable improvement. The cases of acne rosacea were also completely cured. The pituitary treatment was combined with the administration of thyroid and iodine to counteract excessive pituitary stimulation. Injections of 1 c.cm. of the extract were given for about twenty-five days, followed by an interval of a week and then resumption of the treatment. — *Policlinico*, Sez. Prat., July 5, 1937, p. 1293. Abs. in *Brit. M. J.*

A PATHOLOGICAL STUDY OF CARCINOMA OF THE CERVIX

BY P. J. KEARNS

Montreal

WHEN studying the pathology of cancer, especially that form which occurs so constantly in the cervix, one should reflect upon the peculiarities of embryology, anatomy and histology.

The Muellerian epithelium is derived from somatic mesothelium, and invaginates downward to the region of the developing internal os. From that point downward we see a solid plug of epithelium, called the Muellerian hill, invaginating the posterior surface of the urogenital sinus, replacing the latter by a metaplastic epithelium which later in its cranial end forms the goblet epithelium for the cervical canal, and in its caudal part a differentiating squamous epithelium which covers the portio and upper part of the developing vagina. The cervical gland epithelium and the squamous epithelium of the portio should bear common embryonic characteristics, and these should be re-born in times of abnormal embryonic proliferations such as occur in carcinomatous growths. This fact is revealed when we see that corpus cancers usually remain in the corpus uteri and cervical cancers remain in the environment of the cervix. Also, the patterns of epithelium and the degree of malignancy according to these patterns remain fairly constant in the uterine cavity epithelium, while those of the cervix, whether in the canal or on the portio, bear repeated constancies in their embryonic proliferations and in their degree of malignancy because of their embryonic relationship to a parent tissue. It is incorrect to say that there is constant antagonism between epithelia at the region of the meeting of the goblet and squamous epithelium at the external os, and that by reason of this antagonism this area is the site of future cancer of the cervix. In fact there is great reciprocity of epithelium in this region, as is shown by the healing processes of erosion where the loss of one epithelium is replaced by the other.

Portio cancers usually start on the portio and cervical gland cancers in the canal proper. The anatomical position of the portio lends itself to certain irritating factors which give rise to erosion. On the one side there is the chemical influence of the mucous and serous secretions of the uterus; on the other, the acid vaginal secretions coupled with the frequent presence of bacterial irritants of the vaginal vault. Frequent traumatic insults of instrumentation and forcible dilatation of the cervix sphincter cause fissures and tears which become infected and provide for continuous hyperæmia, which, in turn, produces metaplasia. The frequent hyperplastic changes of cervical epithelium which occur in pregnancy and are followed up in the puerperium must tend to upset normal qualities of proliferation and favour metaplastic changes. This is borne out in a study of carcinoma of the cervix, and is illustrated by the relative infrequency of cancer of the cervix in nulliparous women and in the uninflamed vagina and cervix. The underlying cause of cancer in this situation, therefore, appears to be a continuous hyperæmia to the part, with resultant over-nourishment, over-proliferation, loss of normal function in the epithelium, and metaplasia. The presence of sub-epithelial nerve ganglia in the portio (Davis[1]) may influence an abnormal hyperæmia through stimulation and irritation.

Benign lesions of the cervix, such as polypi, erosions, etc., produce atypical hyperplastic epithelial changes, but the epithelium is typically arranged, as contrasted with malignant changes which produce atypical embryonic epithelium atypically arranged. The abnormal latent and inherent properties of embryonic epithelium may be released by two factors, disposition, or spontaneous hereditary qualities, and irritation. In some cases the former predominates and in some cases, the latter. We can, therefore, control the latter by removing the irritant, but we can little influence the former inborn qualities of epithelium. In reviewing our material of cervical cancers over a period of ten years we can produce five cases of extremely early portio carcinoma where there was no laceration or infection. These cases favour the theory of maximum disposition to carcinoma. The majority of our cases of cervical cancer do show, however, the

presence of inflammation or trauma, supporting the theory of irritation as an etiological factor. Our material over a period of ten years indicates that there is a greater tendency for the release of abnormal proliferative qualities of epithelium between the ages of 35 and 50. The occurrence is greater in multiparous than in nulliparous women.

The early macroscopic detection of cancer of the cervix is often obscured by the presence of accompanying pathological lesions such as polypi, papillary erosions, syphilitic ulcers, tuberculosis, and by excessive hyperplasias following in the puerperium. The fashion of the initial growth, whether of intrinsic or extrinsic character, is of importance. Where the initial extrinsic features are predominant early diagnosis is comparatively easy, whereas if the intrinsic features prevail no surface lesion is seen; only a hard, indurating nodule is detected. Rapidly produced erosions, which are usually papillary in type, have a marked inflammatory, cellular, hyperæmic, poorly constructed connective tissue, which bleeds when traumatized, simulating the cellular poorly organized growth seen in carcinoma. Schiller's iodine stain is of practical value in such cases, and detects the proper site for probe excision.

We divide the well recognized macroscopic carcinomatous growths of the cervix into four degrees according to their anatomical position: (1) where the growth is seen to involve the cylinder of the cervix; (2) where the entire depth of the cervical musculature is infiltrated; (3) where the immediate attachments of the uterus, such as the parametria, utero-sacral ligaments and fascia are involved; (4) where the bladder, bowel, or lymphatic glands outside the uterus are involved.

In reviewing our work for the years 1930 to 1936 we find that 20 cases belong to the first degree, 43 to the second, 121 to the third, and 35 to the fourth. We also learned that the greater percentage of the 22.5 per cent five-year cures belonged to the first and second degrees. It is also interesting to compare the growths of the cervix with those of the body of the uterus. We find that 85 per cent of carcinomas of the uterus are on the portio, 11 per cent in the fundus, and 4 per cent in the cervical canal. It is fortunate, therefore, that the greatest percentage of carcinomas of the uterus appear upon the part most easily examined, emphasizing the importance of a discriminating macroscopic study of the portio.

The microscopic findings are of incalculable value in the early diagnosis of cancer. We prefer the histological differentiation taught by O. Frankl.[2] (1) A deviation from the normal size, shape, and staining qualities of cells. Desmoplastic properties are altered. (2) Atypical relationship of one cell to the other. Polarity of cells is altered; they do not advance side by side, but lie obliquely, transversely, and often overlie each other in several layers. The mitotic figures are increased. (3) Atypical relationship to the neighbourhood. Heterotopic properties are altered. (4) In addition to the first three is a tissue reaction in lymphocytes and in young, clear, round connective cells which lies between the invading epithelial cells and the true fixed maternal tissue. This reaction is only seen in early primary growths, not in metastatic growths. This type of exudate must be distinguished from that seen in inflammations where leucocytes, lymphocytes and plasma cells prevail. The above rules are equally applicable to columnar or squamous epithial growths.

Our material has been reviewed in regard to the bearing which the histological structure of a growth has on its susceptibility to radium. The radio-sensitiveness of a tumour is usually inversely proportional to the degree of embryonic differentiation. In 1912 Schottlaender and Kermauner[3] classified cancers of the cervix according to the degree of anaplasia or redifferentiation exhibited by the growth, and grouped them into mature, half mature, and immature types. Broders,[4] in 1920, in a study of cancer of the lip, skin, and genito-urinary system, depended greatly upon the microscopic appearance. He divided squamous cancers into four groups according to the degree of differentiation they showed toward normal squamous epithelium, and stated that surgical excision improved the condition according to the maturity of the cancer. Martzloff's[5] method of classification also depends upon the degree of differentiation, but he also takes into account the regularity and irregularity of the histological pattern and the amount and character of stroma present. He uses the terms spinal cancer cells for those seen in the superficial stratified layer of cervical epithelium, transitional cancer cells for those resembling the middle-cell layer, and spindle cancer cells for those representing the basal-cell layer. The shape of the cell, cell membrane,

staining of the nucleus, and the amount of cytoplasm are also considered. This classification, therefore, is an individual one, and is not practical for teaching purposes. In our clinic we prefer the histological classification of high maturity, mid-maturity, and low maturity, as taught by O. Frankl in his lectures (1927). From 1930 to 1936 we had 219 cases of carcinoma of the cervix of which 14 were high maturity carcinomas, 40 were mid-maturity, 107 low maturity, and 58 were unclassified. At the end of 5 years 7.14 per cent of the high maturity carcinomas were living, 12.5 per cent of the mid-maturity, and 13.08 per cent of the low maturity.

A careful study of the lymphatics leading from the uterus must be made in considering the spread of carcinoma from the cervix. In this clinic we apply the anatomical classification of Wertheim, who grouped the various glands of the lymph tract leading from the uterus into four stations. The first lymphatic station is in the transverse parametrium; the second is in the region of the promontory and takes in the sacral, iliac, hypogastric, and promontory glands collectively; the third station is intermesenteric; and the fourth takes in the cœliac group beneath the diaphragm. These glands are not involved in an orderly consecutive manner, but most irregularly and independently. A wide dissection of all palpable pelvic glands, therefore, will not always assure a permanent cure because all palpable glands are not carcinomatous but may be hyalinized from previous inflammation; conversely, all carcinomatous glands are not palpable and may be overlooked in dissection.

Of vast importance in the prognosis is the site of carcinoma in relation to the lymphatic glands. Carcinomatous spread from the fundus, therefore, must travel through long, tortuous lymphatics in the wall of the uterus, while a portio growth has a less tortuous, shorter course before involving the first gland station in the transverse parametrium. Cervical canal cancer, however, growing as it does primarily and essentially intrinsically, has a short, direct route to the first gland station, with consequent early metastases. An extensive portio growth which involves the vault of the vagina has access to innumerable lymphatics in this region, and these connect with the above-mentioned system. The prognosis in such a lesion, therefore, is less favourable than in a portio growth proper.

The effects of deep x-ray and radium upon cervical cancers will depend partly upon the position, size, and maturity of the growth, and partly upon the sensitivity of the embryonic epithelial cells to the emanations. The presence of acute inflammatory reaction increases the hyperæmia and often delays radical treatment. We have recently been applying deep x-ray before radium and studying the effects upon the carcinoma cells. We have also been studying the cell changes after radium treatment and trying to adjust dosage to reaction in cells. The cell degeneration is similar to, but less marked, following deep x-ray than radium. About ten days after radium applied therapeutically the nucleus ceases to divide at the area treated, vacuolization appears in the cytoplasm, and further immediate destruction of surrounding tissue ceases. There are, however, individual cells of very high resistant qualities often lying in the middle of degenerating areas which remain highly mitotic, apparently unaffected by the emanations, so it would appear that a careful histological study of the growth should be made with each re-application of radium in order to perfect the dosage.

I am indebted to Miss Bessie Stewart, R.N., Radium Technician, for the statistics used in this paper; and to Mr. W. J. Plumpton for his assistance in compiling this report.

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THE TREATMENT OF PULMONARY TUBERCULOSIS AFTER FORTY

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PULMONARY tuberculosis is particularly frequent in adolescents, young adults and adults. However, it is well known that subjects of forty years or over are not spared by the disease. I believe that this group of patients reacts to treatment in a way of its own. For example, they do not seem to progress as favourably as others with collapse therapy. The age-factor should be given greater consideration, and, bearing in mind the anatomical and clinical diagnosis, greater discrimination should be exercised in adopting any one mode of treatment. Yet, the age of forty cannot be taken as a strict and definite limit after which the treatment of tuberculosis is to be considered from a radically different viewpoint. It is considered merely in a general way. In presenting this paper I exclude all cases of tuberculosis which, while having attained the age of forty, have, nevertheless, been afflicted with the disease for many years. Assuming that these patients have been receiving appropriate treatment, the same is to be continued regardless of age, excepting, of course, the cases in which previous treatment has shown poor results and for whom a change is advisable. I shall consider only those patients showing signs of active tuberculosis after having reached the age of forty. There is, unquestionably, a large number of such.

I do not intend to discuss here the clinical aspects and modes of evolution of tuberculosis. However, before discussing treatment, I should like to point out the two chief clinical types which are usually observed.

1. In the first type of patient, who in his youth had an attack of pleurisy or pleuro-pulmonary congestion, but who is actually in apparently good health, one is confronted suddenly with a high fever concomitant with pulmonary signs or a hæmoptysis.

2. The second group of patients includes those who had confirmed tuberculosis during adolescence. After an indefinite period of treatment they were considered as healed and permitted to resume a normally active life, then suddenly, after many years, there is a new outbreak.

Pulmonary tuberculosis in a patient over forty can generally be traced to a lesion, often minute and very old, signs of which were apparent during the patient's youth. The clinical varieties are extremely numerous, and, although a tendency towards sclerosis is most frequent the caseous and ulcerative forms are often encountered. On the whole, pulmonary tuberculosis which develops after forty has no peculiar characteristics either as regards its clinical aspects or its evolution.

TREATMENT

Climatic treatment. — Climatic treatment is, unquestionably, one of the essentials. While collapse therapy in certain cases may give more rapidly gratifying results, nevertheless, a strict sanatorium regimen in an appropriate climate remains one of the most important conditions of success. Absolute rest, together with energetic therapy and sanatorium regimen, is of greatest importance for these patients.

In the case of young patients the selection of a given climate is guided by certain factors pertaining mainly to the evolution. Such is not the case for the older patients. No standard formulæ can be applied here, since each case requires individual consideration. One cannot be too particular in this respect. Before making a decision the patient should not only be submitted to a thorough examination and the clinical aspect of his case taken into careful consideration but the following factors, of a general nature, should also be granted considerable attention: (*a*) actively progressive forms and repeated hæmoptyses are a definite contra-indication to sojourn in a climate of high altitude; (*b*) marked sclerosis frequently entails severe dyspnœa; (*c*) chronic nephritis with albuminuria, cardiac insufficiency associated with arterial hypertension, tendency to acute congestive manifestations, varices, hæmorrhoids, etc., contraindicate high altitudes, particularly so in the case of those with definite cardiac lesions; (*d*) aged subjects, particularly sensitive to cold, frequently show a marked loss of weight

at high altitudes. This can be checked only by their return to a more temperate climate at a lower altitude. In short, patients with congestive manifestations and sensitivity to cold should be directed to a medium or low altitude.

Which forms derive the greatest benefit from this mode of treatment?

Statistics show that among the patients of forty years or over treated and improved by sanatorium regimen the majority were bearers of fibrous lesions or lesions with a tendency to fibrosis. In these cases sclerosis seems to have been hastened by sanatorium regimen and a cure more rapidly effected. Therefore one cannot insist too much upon the necessity of detecting, as soon as possible, fibrous manifestations in older subjects. Spontaneous cure by sclerosis should not be taken for granted. On the contrary, in order to avoid precious loss of time these patients should at once be placed in adequate sanatoria.

Sanatorium regimen effects an entirely different result in aged patients who are the subjects of a caseous form of tuberculosis. In this group of patients sanatorium treatment, while slowing up the progress of their lesions and causing a definite decrease in their congestive manifestations, has been shown to be unable to effect by itself sclerosis and healing of their lesions.

Tuberculosis in older patients may often assume an ulcerative form having a rapidly fatal termination. Rest in a sanatorium is of greatest importance for these persons. However it is generally insufficient. It may effect for a short time a certain improvement which, however, is generally but temporary.

Artificial pneumothorax.—The efficacy of immobilization and compression of the lung by means of artificial pneumothorax has been definitely proved. Do the results apply to tuberculous patients over forty? Articles written on this subject relate frequent immediate failures and insufficient or negative results in the older patients. Particularly demonstrative are statistics which include a large number of patients. One gathers from them that, after forty, the number of cases in which artificial pneumothorax can be realized is considerably limited, since only one patient in four derives any benefit therefrom. Successful results cannot be expected without strict sanatorium regimen, which is absolutely essential for these patients. Results are often uncertain and deceiving in older patients who are allowed to remain in their own surroundings while artificial pneumothorax is maintained. This mode of treatment should be applied only when the patient can be assured a prolonged rest in a sanatorium.

Experience has shown that in the majority of these cases artificial pneumothorax is of doubtful value because of its numerous difficulties and complications. First in order is the difficulty of effecting it, separation of the pleura being frequently impossible. Failure of this mode of therapy is not restricted to the older patients, but it seems to be much more frequent in this group. The possibility of separating the pleura is quite doubtful even in cases with central lesions not affecting the surface or in cases where there is no previous history of pleural reaction. Moreover, even in cases where the separation of the pleura has been successfully accomplished untoward incidents frequently spoil the potential beneficial effects. Extensive adhesions, which cannot usually be overcome, often prevent the compression of the lung. Moreover, often being tempted to continue the insufflation in the hope of obtaining a more complete collapse of the lung, one risks the formation of pleural effusions most unfavourable to the patient. Artificial pneumothorax is not only often impossible to realize; not only do adhesions hinder effective compression, but it seems that pleural effusions are particularly frequent in subjects over forty. Even more, empyema as a result of artificial pneumothorax should be very seriously considered. This complication is rather rare in young persons but older subjects are particularly subject to it. One should, therefore, not be astonished at finding purulent effusion in these cases. It would seem that at a given period, and without any apparent determinating cause, the resistance of the pleura suddenly gives way to a rapidly severe infection. This is one of the main characteristics of artificial pneumothorax in the aged. Whenever the general condition of the patient is deficient empyema is to be feared. Blocking the pleura with oil in certain cases of artificial pneumothorax complicated by febrile empyema gives most unsatisfactory results, since death ensues either by cachexia or bilateralization of the lesions. Therefore, oleothorax is of little value in artificial pneumothorax with empyema. It is not my intention to cast discredit upon a mode of treatment which has so definitely proved its value, but it must be

acknowledged that the results of artificial pneumothorax are far from being as favourable in older patients as they are in the younger ones.

Phrenicectomy. — Phrenicectomy is another method for effecting collapse. Can it be used satisfactorily in older tuberculous patients? Too many intervening factors prohibit a definite judgment on this point. It can be safely advanced, however, that, in choice cases, phrenicectomy is really effective.

A review of the outstanding articles published on this subject shows a surprisingly limited number of observations concerning older patients. One can easily understand that this method was formerly applied preferably to younger subjects, who are perhaps in the majority, and in whom it appeared to be especially important to arrest the evolution of a unilateral tuberculous lesion. Is it possible to explain the lack of proportion between the great number of young patients improved by phrenicectomy and the limited number of older patients to whom this method was applied? To advance that tuberculosis is prevalent mainly in the young would be but partially true today. Unilateral distribution is common to all ages, and, moreover, the tendency to fibrosis, so frequent in the older patient, is precisely the justification for compression by phrenicectomy. The relatively low proportion of older patients treated in this way would no doubt be explained by the fact that artificial pneumothorax has been preferred, being a generally better-known method, and because limited experience of only a few years has not yet shown what may be the consequences at some future date to any patient, and especially so to the aged ones, of permanent section of the nerve.

In the case of older patients phrenicectomy is not devoid of accidents. To quote Bérard: "One cannot condemn too severely the indiscriminate practice of phrenicectomy, the simplicity and innocuity of which are often too appealing to the physician, to the surgeon and to the patient". Therefore, before deciding on this operation, the possibility of serious consequences must be taken into account and clearly explained to the patient. In order to reduce these consequences to an absolute minimum careful consideration must be given to the general condition of the patient and to the evolutionary character of the disease. The general condition of the patient must be considered with the same attention as it would be in the case of a more serious operation requiring general anæsthesia. With regard to the evolutionary character of the lesions we are not concerned with the indications for phrenicectomy in older tuberculous patients. The question is to determine whether the actual evolutionary character of their lesions is compatible with surgical treatment. Unquestionably, phrenicectomy, as an operation, implies numerous risks when performed during an acute stage of the disease. Most aged subjects who have had phrenicectomy were subjected to this operation during a period of remission of their symptoms. In most of these cases no untoward after-effects were noted.

Improvement may be expected in two groups of patients.

1. Cases in which phrenicectomy was performed after an unsuccessful attempt at artificial pneumothorax. Following an unsuccessful or inefficient pneumothorax, even if recognized as such only after a long interval, phrenicectomy may, and should, be advised. There is no appreciable difference in the results obtained, whether one has to do with forms with ulceration, with cavitation, or with sclerosis. In cases where artificial pneumothorax has failed at the outset or has been discontinued phrenicectomy provides, in aged subjects, a rapid and often unexpected improvement.

2. Cases in which phrenicectomy was performed at the outset. Because of the repeated failures by pneumothorax, and because of the rapid formation of pleural effusions and adhesions, phrenicectomy should be practised at once. In this way loss of precious time can be avoided and the patient spared the pleural effusion and incidental high fever. Several authors have stressed this point. To quote Morin and Cardis: "As a general rule we have recourse to surgical treatment only after artificial pneumothorax has failed. This failure may be due to complete symphysis of the pleura or to multiple adhesions which render pneumothorax an inefficient and dangerous procedure. However there are certain exceptions. There are certain contraindications to pneumothorax, mainly the age of the patient and the functional value of the other lung. We believe that, over fifty, phrenicectomy is better tolerated than artificial pneumothorax". The pathological and evolutionary characters of the lesions should serve as a guide to the indications of phrenicec-

tomy. Pulmonary sclerosis may spontaneously effect a complete cure without any help from without, but, more often, this tendency to fibrosis is incomplete, and it is in the latter case that collapse therapy by phrenicectomy will accelerate the healing process. Therefore the fibrous and fibro-ulcerative forms of tuberculosis are best treated by phrenicectomy. In the ulcerative forms with extensive lesions its action is more doubtful. In the cases of ulcerative lesions of the middle portion of the lung or of the apex results may be more successful, though the ideal form would be one in which the lesion is situated at the base.

There are very few contraindications. Blood pressure and renal function should be checked, but in the vast majority of cases, after a period of rest, the older tuberculous subjects can well undergo the operation without risk.

Thoracoplasty. — This shows good results. Formerly a serious and mutilating procedure, it has become less so since the introduction of topographical thoracoplasty in which only two or three ribs are resected opposite the very seat of the lesion. The question arises as to whether aged patients can well meet the risks implied by the operation. Bérard, considering the age factor, wrote: "Neither advanced age nor pregnancy contraindicate thoracoplasty. The optimal age-period is from 16 to 40. We have cured patients of 46. Completely satisfactory results have been obtained in patients of 45 and over. Therefore we may conclude that thoracoplasty need not be reserved for the young, but may be practised with equal confidence in older subjects".

For practical purposes one can consider the general contraindications and those furnished by examination of the respiratory tract. In general, cardiac and renal insufficiency, cutaneous affections, intestinal and laryngeal lesions, emphysema, cyanosis and dyspnœa, constitute a serious danger. Moreover, too extensive fibrous lesions must not exist in the opposite lung. Pulmonary lesions were formerly of primary importance because thoracoplasty could be practised only when the lesions were unilateral. The slightest lesion on the opposite side, whether clinical or shown by x-ray, constituted a definite contraindication. However, since the introduction of topographical thoracoplasty we are able to use this mode of treatment in bilateral lesions, because this modified method causes less shock, and, being localized directly over the seat of the lesion, does not interfere with the function of the rest of the lung.

The fibrous form of tuberculosis with cicatricial retraction is unquestionably the most favourable condition for thoracoplasty. Besides this form, which constitutes the main indication, there is the ulcerative type with large cavities, the compression of which cannot be effected by pneumothorax or phrenicectomy, also ulcerations in the collapsed lung which remain in spite of compression by pneumothorax. There is still another indication for thoracoplasty. In speaking of pneumothorax in older patients I mentioned the frequency and serious consequences of purulent pleural effusions for which there seems to be no effective treatment. The results obtained by thoracoplasty in similar cases in young subjects have encouraged surgeons to try the same method in the older ones. The results have been highly encouraging. Might not thoracoplasty be tried in the more acute congestive forms with unilateral lesions? Experience has shown that thoracoplasty, under such conditions, is doomed to failure.

With these precautions in mind, and following such conditions and indications, thoracoplasty may well be performed in patients past forty.

I have endeavoured to give a rapid summary of the various current methods of collapse therapy, each of which has its own definite indications. However, since the aged patient generally has some visceral lesion or insufficiency, careful consideration must be given to the various factors involved before choosing any one method.

A NEW HYPERTENSIVE AGENT. — E. Desmarest recommends the use of a new preparation—pressyl—for the treatment of hypotension before, during, and after operation, and particularly in spinal analgesia. It is a combination of camphramine, or beta-diethylcarbonamide of camphosulphonyl-N-methylpyridine, a cardiac and respiratory stimulant, and of pressedrine, or alpha-amino-phenylethylcarbinol sulphate, whose action resembles that of adrenaline and ephedrine. Pressyl may be administered orally, subcutaneously, or, in emergency, intravenously. It elicits a rise of blood pressure as great as that caused by adrenaline, though not quite so rapidly, while its effect lasts about twice as long as that of ephedrine. — *Anesth. et Analgés.*, June, 1937, p. 391. Abs. in *Brit. M. J.*

RENAL AND URETERAL ANOMALIES*

BY W. L. RITCHIE

Montreal

IN the study of anomalies, I think that in the genito-urinary system we encounter a greater variety of both congenital and acquired types than is found in any other part of the body. This is perhaps explained by the fact that in part many of these anomalies are composed of right and left duplications, and also in part, by the manner of development embryologically.

Renal anomalies have long been familiar to the anatomist and the pathologist, but in the case of the surgeon and urologist it has only been since the development of roentgenological methods of examination that a fuller appreciation of them has developed, and with the increasing popularity of roentgenological examinations their demonstration is becoming quite common. These anomalies have been shown to occur much more frequently in the male than in the female.

It is a general law in medicine that an abnormal organ is more susceptible to pathological changes than a normal one, and as these anomalies in the kidneys are being found with increasing frequency the need for careful employment of every method of examination is therefore emphasized. But what is even more important is close and unselfish teamwork between the urologist and roentgenologist.

In our hospital we insist on a very definite routine procedure. First, plain plates are taken in all cases; the plain plate has proved to be very informative, often suggesting the type of the subsequent examinations to be made, and is frequently referred to as a "re-check". This is followed by a retrograde filling and plates taken prone, erect, and with partial withdrawal of the catheters for ureteral studies. When necessary intravenous pylograms, cystograms, and frequently gastro-intestinal examinations by the barium meal and barium enemas are made.

Probably the most complete classification of renal and ureteral anomalies is that of Papin and Eisendrath, but for this paper, I have used a shorter classification, as it covers the more frequently encountered anomalies, and those which I felt could be discussed in the period of time allotted. It is difficult to separate completely renal from ureteral anomalies, and so I have combined the two.

KIDNEY

1. *Number.*—The normal number is, of course two, *viz.*, right and left, but it can be decreased or be in excess.

(*a*) The solitary kidney. This is considered a very rare anomaly, and is due to the failure of the ureteral bud to develop, and consequently is associated with an asymmetrical trigone. This, therefore, should only be diagnosed when there are no traces of the opposite kidney.

(*b*) A supernumerary kidney is probably the rarest of all abnormalities and must not be confused with reduplication of the pelvis and ureters, *i.e.*, the double or bifid kidney. Only about thirty authentic cases have been reported. There are four forms: (1) pseudo-double—single mass of parenchyma with two pelves and single ureter; (2) two kidneys with two ureters, uniting to form single ureter; (3) same as above, but the two ureters opening separately into the bladder; (4) two kidneys with the ureter of the upper opening into the pelvis of the lower. This is the most common type.

2. *Position.* — (*a*) Ectopia. — Acquired. — In this type the kidney has reached the normal position in the loin, has a blood supply coming off the aorta at proper level, and has a ureter of normal length, and then gradually has wandered from its normal position. These cases are classified as lumbar, iliac or pelvic, depending on the degree of descent. It may be unilateral or bilateral. The renal pedicle being elongated, we see the ureter kinked and tortuous.

(*b*) Congenital ectopia.—This condition is due to failure of the embryonic kidney to make its normal ascent. These are described also as pelvic, iliac or lumbar, may be unilateral or bilateral, and may be in the last-named either symmetrical or asymmetrical in position. All

* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Radiology, Ottawa, June 24, 1937.

such ectopias are known as homolateral. In contradistinction to these are the heterolateral or crossed ectopias, in which one or both of the kidneys have crossed to the opposite side. Radiographically, as the result of failure of rotation, the pelvis is situated anteriorly and of unusual outline, and the ureter, being abnormally short, leaves the pelvis at unusual angles, more often extending upward before taking its downward course.

The fused kidney.—The most common type of this group is that known as the "horseshoe kidney". This is described as the union of two kidneys to a lesser or greater degree at their mesial borders. So long as one-half extends beyond the midline of spine, the anomaly belongs to this group. The degree may vary from a narrow fibrous band to a complete parenchymatous fusion. They may be normal in position or lie in the pelvis, and may be single or double. In a plain plate, kidney shadows rather lower than normal, close to the vertebral column, with clearly defined outline except at lower poles, are very suggestive of such, and in the pylogram one usually sees the defect of rotation of the pelves, which face forward and have the calices on the anterior surfaces. Gutierrez has worked out a pyelographic triangle that is of interest. He stated that normal kidneys show a 90 degree basal angle, whereas horseshoe kidneys have less than 20 degrees.

3. *Structure.* — Hypoplastic kidney, renal aplasia, and congenital absence of one kidney are often confused. These all represent embryonic defects or lack of development during interuterine life. Radiologically, the hypoplastic or infantile kidney is small, with small sacculated pelvis, and the calices either absent or multiple and abbreviated. The ureter is patent. In aplasia the pelvis is absent, the ureter not patent, and there is no function.

Another type of kidney that some writers consider as an anomaly of structure, while others do not classify as such, is the polycystic kidney. However, as they are practically always congenital in origin, I have included these as an anomaly. These are usually familial. They are generally bilateral, although cases are on record of unilateral involvement.

In the radiological examination of polycystic kidneys retrograde pyelography is the method of choice, as, because of low renal function, intravenous pyelography is usually not satisfactory. Both kidneys must be injected, as this is most helpful in differential diagnosis. One usually sees elongation of the pelvis, and the pressure of the cysts may cause the calices to become quite markedly concave. These findings, of course, are also found in renal neoplasms, but the fact of being bilateral rules out the latter. In cases of a unilateral polycystic kidney this would not be of value in diagnosis, and I can see where it is impossible to make a diagnosis radiographically in this type of case. We have never had a proved unilateral case in our hospital, and they are very rare in the literature. There are variations in the type of pelvis, another being the dilated type, where the pelvis is large and broad and the calices short and stubby. This form makes it necessary to differentiate from hydronephrosis. In the latter, while we find a large pelvis, the calices are usually clubbed and the concavities more or less lost, whereas in polycystic kidneys the calices may be blunt are nevertheless not clubbed and the concavities are present. It seems to be a controversial point as to whether the broad pelvis is really a later stage brought about by infection. Occasionally, calculi are found in these kidneys, and also cysts may rupture into pelvis.

RENAL PELVIS

Duplication.—This varies in degree and may be entirely intra-renal, all branches being within the kidney, or the ureter may divide some distance from the kidney, or there may be complete reduplication. Frequently, in the retrograde pyelogram this may be missed, depending on the level at which the ureters unite, and more complete information will be obtained by the intravenous pyelograms. Radiographically, what is most commonly seen, is a large lower pelvis, with more or less normal development of calices, and the upper pelvis is smaller and has more rudimentary development of the calices, giving what is described as the "hammer-head" type.

URETER

Here we have duplication, unilateral and bilateral; these may be partial or complete, and vary as to the point of termination and exit, *i.e.*, may end in the bladder, in the urethra or in the vagina. Diverticula are found in the ureter, and, like all such, are either congenital

or acquired. The former are the result of an incomplete attempt to form a second ureter. Practically all are found in the lower ureter.

Ureteroceles are found at the lower end and result from stricture. As these dilate they usually bulge into the bladder. It is difficult in the early stages to differentiate this radiologically from a low diverticulum.

ABERRANT VESSEL

Occasionally, an artery may be abnormally placed, and crosses the uretero-pelvic junction in such a manner that it causes pressure, with a resultant hydronephrosis. Usually, there is seen in the radiograph a normal ureter and the dilatation beginning at the junction of pelvis and ureter.

STAPHYLOCOCCUS TOXOID FOR RECURRENT STYES*

BY ALEXANDER E. MACDONALD

Toronto

STYES often follow a period of ill health, but the condition generally yields readily when reinfection is prevented. At times this is not so, eye cups may be discarded, glasses ordered, lid margins painted, near work limited, proper lighting supplied, and still a succession of reinfections occur, without any tendency to become less virulent, much to the annoyance of the patient and the embarrassment of the physician. There may be a family tendency to staphylococcus infection as far as the lids are concerned, often coexisting with hypermetropia and a fair skin, and in dealing with this so-called minor malady I have long desired more satisfactory treatment. Vaccines, stock or autogenous, have not given good results.

In 1933 therapeutic success was found in controlling chronic staphylococcus osteomyelitis with the toxoid of this microbe, and through the courtesy of the Directors of the Connaught Laboratories and Dr. Dolman I was able to use the toxoid in the treatment of recurrent styes in the experimental stage. In 1933 Dolman, working at the Toronto Connaught Laboratories, confirmed a previous finding that the staphylococcus produces a true exotoxin which in experimental animals produced mass necrosis of tissue or even death. The addition of formaldehyde to the toxin produced a highly antigenic toxoid that increased the immunity for staphylococcus infection. Serum from the individual showed the degree of protection afforded by titration against a staphylococcus toxin of known hæmolyzing power. Some of the following clinical and private cases, especially the latter, that have been followed for over three years indicate that we have a valuable new remedy in conjunction with the usual care.

CASE 1

Dr. G., aged 24, was seen September 10, 1933. He had had at least one stye every month for a year, a new stye developing before the previous one had disappeared. On examination his right upper lid was red and swollen and much pus was found on incision of the stye. An examination showed *S. aureus* in pure culture. He had previously used an autogenous *S. aureus* vaccine made from a stye without benefit.

September 14, 1933: a new stye had developed and he was willing to be the first to try the toxoid treatment; 0.05 c.c. was injected into the deltoid muscle.

September 15, 1933: patient complained of pain in his back and legs. His temperature was normal and there was a 50 by 60 mm. swollen area at the site of the injection.

September 16, 1933: the inflamed area had increased to 60 by 80 mm. The arm was tender and painful.

September 17, 1933: there was only slight discomfort although the area had increased to 80 by 100 mm.

September 18, 1933: a new stye had started, but three days later it had not developed pus, although there was moderate swelling and discomfort; 0.1 c.c. of toxoid was injected into the deltoid of the other arm, which produced less reaction.

September 27, 1933: 0.15 c.c. of toxoid was followed by slight malaise and a still smaller area of reaction at the site of the injection.

October 3, 1933: 0.2 c.c. of toxoid was injected, and when next seen on February 17, 1934, the lids were quiet. No new styes had appeared and a small papilloma was removed from the right lid under local anæsthesia.

September, 1936: the patient said he had had no styes and his lids were comfortable although he was doing moderately heavy near work.

CASE 2

Miss G., aged 22. In August, 1930, a stye of the right lid had broken the previous night. The usual treatment with antiseptics and fomentation had been ordered.

September 1, 1931: a stye of the right upper lid was incised and yielded a pure culture of *S. aureus*.

September 13, 1933: a large stye was present on the right upper lid. Several had developed since her last visit.

September 14, 1933: 0.05 c.c. of staphylococcus toxoid was injected into the muscle of the leg, which produced a 67 by 73 mm. reaction. When seen the following day moderate malaise and discomfort had been experienced for 48 hours.

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* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Ophthalmology, Ottawa, June 23, 1937.

September 21, 1933: 0.1 c.c. of toxoid was injected.

September 28, 1933: 0.15 c.c. of toxoid was injected, followed by a marked reaction with enlarged glands in the groin.

October 3, 1933: a new stye developed in the left eye, which was opened on October 5th, yielding considerable pus; 0.2 c.c. of toxoid was injected.

February 1, 1934: no new styes had developed and the patient made the observation that her skin had been much clearer; she had occasionally suffered from small pimples.

October 11, 1934: the lids had remained clear. The patient had been doing secretarial work and rest glasses were ordered for near work.

June 24, 1935: there has been no new stye, but the patient asked for toxoid, as it had proved beneficial to her complexion before. On examination one small red area was seen on the right lower lid which did not contain pus; 0.1 c.c. of toxoid was injected, followed on July 3rd by 0.15 c.c.

July 15, 1935: 0.25 c.c. of toxoid was injected; only the first of this series of injections was followed by any reaction. The small red area showed pus and staphylococcus on smear.

May 7, 1936: there was a localized red area and moderate blepharitis squamosa. One lash was pulled showing a small bead of pus, which did not develop.

CASE 3

C.S., a boy, aged 18 months, was seen suffering from small red masses at the margin of the right upper and left lower lids. The mother said that several styes had appeared in recent months. The usual treatment with antiseptics was carried out.

February 12, 1932: two new styes were present on the right lids. Fomentations and antiseptics were used.

March 23, 1932: there was a mass of granulation tissue near the right upper punctum which hung down from the conjunctival surface. Some blepharitis was present and zinc drops were ordered.

March 29, 1932: two new styes appeared.

April 30, 1932: at the Hospital for Sick Children a chalazion was incised under general anæsthetic and the granuloma removed.

November, 1932: a new chalazion was present.

December, 1932: a mass of granulation tissue was seen on the right lower lid margin which remained red until August, 1933, and a new area of redness appeared at the outer margin of the lids.

November, 1933: after consultation, a series of staphylococcus toxoid injections was given. During the treatment a stye appeared on the left eye, but did not develop. The father was strongly against glasses, and it was not until September 13, 1934 that glasses were ordered, although a refraction had been done in 1932 and glasses advised.

December, 1934: the mother was afraid another stye was developing as the right lid margin was red, but the inflammation subsided when an aberrant lash which rubber the cornea was epilated. The child, now aged 6, with –1.00 cylinder had 6/9 vision in each eye and with both eyes saw part of the 6/5 line.

March, 1936: the right lid was red and another aberrant lash was epilated. No new styes had developed since the toxoid and the lids had been quiet.

CASE 4

Miss C., January, 1933, aged 54, complained of having had several styes in the past few years and inflamed lid margins. After refraction glasses gave comfort until January 20, 1934, when a stye on the left lid was incised, yielding much pus which contained Gram-positive cocci.

In January and February, a series of 8 injections of staphylococcus toxoid 0.05, 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 1 cc. was given. Moderate reaction followed the first injection, but the patient was not upset.

April 4, 1934: a red area appeared on the lid margin but did not develop. It was discovered that she had been using an eye cup regularly. This was forbidden.

May 14, 1934: moderate blepharitis was present and an aberrant lash was epilated.

September 4, 1936: another small red area appeared at the root of a lash, but did not form pus.

This patient had had frequent attacks of follicular conjunctivitis. She had a very fair delicate complexion and had always been troubled with what she called a family characteristic—red eye-lids. She herself suggested another series of toxoid which will be given if any further inflammation occurs.

The above cases are presented from private practice, as it has not been possible to obtain satisfactory follow-up visits from hospital patients.

CASE 5

At the Toronto General Hospital, Mary E. was seen on December, 1933, suffering from the fourth stye in two months. She stated she had had 6 or 7 in the past year. A series of 4 staphylococcus toxoid injections were given following a microscopic finding of Gram-positive cocci from the incised stye.

CASE 6

Violet R., aged 34, had suffered 9 styes in 6 months. A series of 7 staphylococcus toxoid injections were given between March 2, 1934 and April 20, 1934 at regular intervals, 0.05, 0.15, 0.2, 0.3, 0.2, 0.4. The patient was being treated in the surgical ward for a low intermittent fever, and she complained of ill health of long duration. On her discharge from the hospital her lids were clear and were still clear when she was readmitted in November, 1934, suffering again from a low intermittent fever.

CASE 7

June 28, 1934: a consultation was requested for a patient, aged 38, suffering from the fifth stye within two years which had ruptured the previous day. The culture showed the presence of *S. aureus hæmolyticus*. Following a series of four toxoid injections his lids cleared and no further report of him has been registered.

We have long realized the need for a treatment that will develop a resistance to recurrent staphylococcus lid infections. This short series of chronic cases would indicate that staphylococcus toxoid does increase the resistance against this particular type of infection.

DISCUSSION

Case 1 is probably the most impressive success. His severe reaction was caused by a strain that occurred in lot 4 which has since been eliminated. This lot was used in Case 2 where the glands in the groin became painfully enlarged. None of the other patients suffered serious reactions. Nor in three of the patients (Cases 2, 4 and 5), when a succeeding series of injections were given after an interval of months, did any severe reaction occur. Case 2 showed that staphylococcus skin infections were cured by the toxoid, and

the woman wished a second series, twenty months after the first, for her complexion. Case 3 shows the importance of glasses as an aid in dealing with a very protracted severe staphylococcus infection. His discouraged parents were worried, and two consultations resulted in no better method of treatment. The toxoid was a success, and the lids have remained clear, except for the occasional aberrant lash, a relic of the blepharitis and styes.

Patient 4 had suffered for over 40 years, visiting specialists in several countries, and she is firmly convinced that her family tendency to red lids, blepharitis and styes is held in check by the toxoid. A recurrent follicular conjunctivitis has not been helped; microscopic examination showed the pneumococcus to be the cause of this on at least one occasion, when seen early in an attack. Patient 5 had two series of injections and was definitely benefited, although the importance of hygienic care and refraction are shown as adjuncts to toxoid treatment. Sad to relate the "cure" is ascribed by the family to tin pills!

CONCLUSIONS

1. It has been shown experimentally that antitoxic immunity against staphylococcal infection may be increased five- to ten-fold by a series of toxoid injections. Clinically, it seems sufficient to prevent reinfection, while refraction and the usual treatment further insure the safety of the patient.

2. Clinically the protection seems to last from two and one-half to three years; laboratory experiments show that the protection, as judged by serum tests, falls about 50 per cent in one year.

3. When a family susceptibility to staphylococcus infection is present in fair people the toxoid should be used early in addition to general treatment.

Case Reports

A CASE OF INTRA-ABDOMINAL PREGNANCY

BY G. B. BIGELOW

Prince Albert, Sask.

Mrs. A.B., aged 26, was seen on November 6, 1937.

Complaint.—Pain in the left lower quadrant of the abdomen.

History.—About one week previously the patient began to have a dull ache in the left lower abdomen and this pain had been getting progressively worse from day to day. It was constantly present and was now a sharp burning ache. Her last normal menstrual period was on October 1st, but she bled for two days again on October 15th and again for a day on November 3rd. She had had no vomiting or nausea. There had been no urinary symptoms. Her previous history was irrelevant to present illness. She had had one child, three years ago; pregnancy, delivery and puerperium were normal.

Examination.—No abnormality except a slight, diffuse enlargement of the thyroid gland which she stated had been present since she was 12 or 14. There were no signs of toxicity from the goitre. The abdomen was soft and freely movable during respiration. Palpation discerned some slight tenderness deep down in the left lower quadrant, but no mass or other abnormality was to be felt. The cervix was somewhat enlarged and contained a small cyst on its vaginal aspect. There was a tender, soft mass in the left fornix close to the side of the uterus about the size of a golf ball. It was not movable. The uterus was not enlarged. Urinalysis, normal; white blood count, 12,900, with 75 per cent polymorphonuclears.

The patient was hospitalized and treated for pelvic inflammation with possible pyosalpinx by means of heat to abdomen, hot douches and sedatives. This treatment relieved the pain, but it returned the following day. On November 9th another vaginal examination was carried out. This revealed the mass in the fornix to have increased in size to that of an orange and to have become much more tender. The diagnosis was changed to tubal pregnancy and operation was decided on.

The patient was given gas and ether as the anæsthetic. On opening the abdomen a fair quantity of blood and blood clot was found in the pouch of Douglas. The left tube and ovary were slightly congested and the ovary contained several small cysts. Situated behind the broad ligament and up against the lower half of the left side of the uterus was a shaggy irregular surface covered with black, clotted blood and fleshy material. On removing the blood clot, the muscular walls of the uterus could be made out plainly and a depression of three-eighths of an inch deep and 2 inches in diameter left in the uterine wall. A slight oozing from this surface stopped with the application of hot sponges. The left tube and ovary were removed and a large rubber tube was inserted in the pouch of Douglas for drainage.

The patient was restless from the beginning and on the second day after operation her pulse began to climb. She complained of palpitation and shortness of breath. During the same night she became irrational and very restless, and on the third day became steadily worse. She died late in the afternoon of the third day from an acute thyroid crisis.

The operation incision was enlarged post-mortem, and the bladder, uterus and appendages removed for further study. Neither the tube removed at operation nor the right tube removed post-mortem showed any signs of rupture of an embryo through it, and neither broad ligament showed signs of any abnormality. There was a deep hole in the back of the left side of the uterus which was almost through to the inside of that organ.

Pathological report stated the finding of chorionic villi in the fleshy debris scraped from the uterine wall during the operation. The ovary contained multiple follicular cysts; a fibrosis and non-specific salpingitis were also noted. The pathologist was quite emphatic about the fact that a pregnancy in that tube could not have existed. This confirmed the diagnosis made at operation, namely, an intra-abdominal pregnancy engrafted on the outside of the uterus.

UTERUS DIDELPHYS

BY N. E. NYKIFORUK

St. Paul, Alta.

Mrs. J.P., aged 18, primipara, was first seen at the eighth month. A bimanual examination was thought advisable when she herself believed she had two vaginal openings and especially when she said that a sister of hers also had the same condition. The examination revealed a larger left vagina and a small right vagina which barely admitted one finger and at a depth of about two inches connected with the larger vagina by a small opening. A flat male type of pelvis was also noted.

At term, after a fair test of natural labour, episiotomy and mid-forceps were necessary. The baby was delivered alive but considerable compression probably contributed to its death after thirteen days. The double cervix was found only after I discovered the fundus to be over towards the right iliac fossa and was searching for the cervix in preparation for uterine packing for a moderate post-partum hæmorrhage. The right half of the uterus was pregnant and its cervix was easily accessible from the left vagina. The left cervix was normal and, of course, closed. The right vagina in this case seems to be of a vestigial nature.

As the baby weighed only six pounds it would seem that to get a live and healthy child it will be necessary to do a Cæsarean section for the next confinement, unless of course both halves of the uterus become pregnant at once, when other procedures may be necessary.

This case also brings up the question of hereditary influence in these congenital conditions. The patient's sister, by the way, had only a double vagina and was delivered this summer at another hospital, with no known complications.

CÆSAREAN SECTION FOR PLACENTA PRÆVIA

BY H. A. HAMMAN

Fort Vermilion, Alta.

Mrs. T., aged 33, was first seen at the termination of her fifth pregnancy in the early morning of August 11, 1937, having been in labour five hours. She was deathly white and lying in a pool of blood.

Examination revealed the os patent to one finger and the presence of placenta prævia. An immediate effort was made to quicken dilatation, as it was hoped that a version could be effected and a foot brought down. Efforts to accomplish a version failed and the frequent pains and copious hæmorrhage were so weakening that signs of dehydration were beginning to show about the eyes.

The patient was bundled into a car and brought to hospital, where immediate preparations went forward to place her on the operating table. At 9.00 a.m. she was taken to the surgery. Anæsthesia was induced by myself, using chloroform in ether and later switching to ether by the open method. As soon as anæsthesia passed from the first stage it was turned over to the Sister, and I prepared for the operation. The patient's pulse was 130, so all possible haste was made in order to deliver her. The assistants were the one Sister and two untrained nuns.

Incision was made down the mid-line from about three inches above the umbilicus to a point about three inches below that point, over the most prominent part. Once through the abdominal wall a similar incision was carried into the uterus. No time was spent in catching bleeders here, and the cavity was speedily reached, the baby's feet grasped, and the head eased out of the pelvis. A little difficulty was experienced in this manœuvre. The cord was severed and tied, the baby was handed over to another nun, who was asked to attempt resuscitation as the infant was not making any effort to breathe. It was removed from the room. The placenta was manually removed from the lower part of the uterine wall and the excess blood sponged out. Deep sutures were then placed in the uterine musculature and firm closure effected. Muscular contraction had stopped the bleeding. At this point the patient showed signs of distress, the pupils being dilated, so anæsthesia was stopped, an ampoule of coramine given hypodermically, while closure of the abdominal wall went forward. Pads and a firm binder applied, and the patient was given 0.5 c.c. of pituitrin.

At 12.00 noon she was conscious; the pulse was strong, rate 76; no vomiting. A saline was begun as soon as patient placed in bed and its effect was also manifest in the pulse showing better volume. At 3.00 p.m. the pulse was 84. Coramine was again administered and at 4.00 p.m. 0.5 c.c. of pituitrin again. At 4.30 p.m. the patient complained of headache and distress so codein, gr. 1/6, was ordered. The temperature at this time was 98.4° F. Sips of iced ginger ale were allowed. At 10.00 p.m. another hypodermic was given for sedation and patient spent a fair night.

Her post-operative course was most satisfactory, considering what she had been through. There were some headache and fever, due probably to the development of a stitch abscess and an infected tooth, but these were not serious. She was up in a chair on August 25th, and was discharged perfectly well on September 2nd. The baby did well, and is gaining weight steadily.

TRAFFIC ACCIDENTS AND ALCOHOL.—H. S. Nissen-Lie has investigated the conditions under which traffic accidents occurred in Oslo in the two months from November 20, 1936, to January 20, 1937, with special reference to the alcohol found in the blood of 160 persons brought to a first-aid station. Apart from the six persons coming to the station more than twenty-four hours after injury, there were fifty male and twenty-five female pedestrians, twenty-four children under the age of 14, twenty-five passengers, twenty cycling messenger boys, and ten motor car drivers. None of the cycling boys seemed under the influence of alcohol, and only two of the twenty-five female pedestrians showed definite signs of alcohol poisoning. Analyses of the alcohol content of the blood of thirty-three of the fifty male pedestrians showed that all but five were under the influence of alcohol, the concentration of which in the blood of these five cases was under 60 mg. per 100 ml. The lowest figure among the analyses rated as positive was 123 mg. per 100 ml., and the highest was 350 mg. per 100 ml. In as many as fifteen cases the figures were between 200 and 300 mg. per 100 ml., and only in eight cases did the analysis show more than 300 mg. per 100 ml. This study suggests that considerably more than half of the adult male pedestrians who are victims of traffic accidents in the streets of Oslo are under the influence of alcohol at the time. The author concludes that most traffic casualties belong to one or other of three groups—namely, children, drunken adult males, and cycling messenger boys. — *Tidsskr. norske Laegeforen.*, August 1, 1937, p. 799. Abs. in *Brit. M. J.*

Therapeutics and Pharmacology

NOTES ON POST-OPERATIVE VOMITING

By H. O. Foucar

Chief of Surgery, St. Joseph's Hospital, London, Ont.

In considering this sign it is well to review the types seen, for here lies the clue to the treatment.

Moderate vomiting may be present during the first day and does not require special care. After that time, however, this occurrence should not be dismissed too casually. A mild toxæmia due to dehydration may cause vomiting, which subsides when the fluid balance is restored. Nervousness is a common cause and may result in extreme anorexia nervosa. In this group sedatives are essential. The stomach should be washed out, to exclude retention. Fluids must be given by other channels to ward off dehydration in this as in all other groups.

The vomiting of acidosis is less prevalent now since it is no longer considered necessary to purge and starve a patient. Fluids, glucose and alkalies relieve this situation. More important, however, is the vomiting of alkalosis because it is often confused with the former, and alkalies are given to the patient's undoing. For want of a better one, the term "high intestinal intoxication" has been applied to this type. With continued vomiting hydrochloric acid is lost and the blood chlorides are depleted. This sets up a vicious circle, which, if not broken, spells disaster. The treatment is simple and the results spectacular. Saline solution given intravenously changes the outlook promptly.

Vomiting due to varying degrees of retention is relieved by lavage. Hyper-secretion seems to be a factor in some cases. A small indwelling tube is probably easier here, for the patient may then relieve himself at will by aspiration. Sometimes the pressure is sufficient to push out the plunger of the syringe without the use of suction.

Acute gastric dilatation must be recognized promptly or a fatality results. The patient is in urgent need of gastric lavage, continued as long as the condition lasts. Because it is thought that the superior mesenteric vessels exert pressure on the duodenum the patient should be turned on to his face, thus relieving the obstruction by allowing the vessels to fall away from the duodenum.

Another interesting type is that due to late retention. It may be observed about the seventh to the tenth day, especially after gastroenterostomy. Here apparently the gastric tone is not sufficient to cope with the increasing diet. Liquids pass through the stoma and the patient is comfortable. As the diet is increased retention takes place and the patient complains of a feeling of fullness or of weight. He does not relish his meals and may even regurgitate some food. If this entity is not recognized the patient finally refuses to eat and begins to vomit undigested food. In one case the stomach contained 3,000 c.c. Lavage early, to keep the stomach empty and so allow it to regain its tone, followed by frequent small feedings, and then a return to a regular diet, remedies the condition.

Vomiting due to mechanical obstruction should be rare, if care has been used in the operative procedure. It is diagnosed by excluding the other types, and its treatment consists of exploration and correction of the underlying factor.

Finally there is the vomiting of paralytic ileus. Pitressin, spinal anæsthesia and hypertonic saline intravenously have been suggested. Others recommend that purgatives and enemata be eliminated, that the patient be given nothing by mouth but that large quantities of normal saline solution be given intravenously by the continuous drip method. "Intestinal decompression", or the use of an indwelling tube in the stomach or duodenum with suction applied, is preferable to enterostomy.

It can readily be seen then that the vomiting due to toxæmia, nervousness and to disturbed metabolism can usually be prevented by proper management. The importance of gastric lavage, of maintaining the fluid balance, and of preventing the depletion of blood chlorides is also evident.

THE TREATMENT OF INFECTED WOUNDS WITH GLYCERINE

By O. A. Cannon and H. T. Ewart

The Steel Company of Canada, Ltd., Hamilton, Ont.

The treatment of infected wounds with glycerine packing is carried out in several institutions but is not in general use. We have been using glycerine wherever opportunity has been afforded for the past six months and find that it is a very effective and simple treatment. Of our group of cases, we wish to briefly report three.

R.C. Was treated for an infected hand by the usual conservative methods for five weeks without improvement. During this time the hand was incised twice. At the end of this time a third incision was made and the wound tightly packed with glycerine gauze. Healing was rapid and in two weeks the wound was clean and closing satisfactorily.

B.W. A large ischio-rectal abscess was incised and packed with gauze soaked in glycerine. The infection cleared quickly but daily packing was continued until the cavity filled in. This took about two weeks. Subsequent examination showed healing complete with a minimum degree of induration.

R.E. Patient complained of soreness in his right axilla which slowly developed into a suppurative lymphadenitis. He gave a history of a similar attack some 10 years previously, when he lost about two months' work. In due course the abscess was incised and a large amount of pus evacuated. The cavity was packed daily with gauze soaked in glycerine and was practically obliterated after eleven days. Seventeen days after incision the patient returned to light work.

The technique used is very simple. The area is first cleaned well with alcohol. A sterile gauze bandage is soaked in glycerine and the infected wound packed tightly. Glycerine is then poured over the loose end and covered entirely by a dry dressing. Packing is carried out daily as the hygroscopic action of the glycerine has then been almost exhausted. There is very little pain involved in packing and none on removal of the gauze.

From the results obtained, we feel that this treatment, due to its simplicity and effectiveness, is worthy of more widespread use.

Clinical and Laboratory Notes

ERYSIPELAS: A PRACTICAL METHOD OF TREATMENT THAT WORKS

By R. E. HOLMES

Windsor, Ont.

Erysipelas, a disease of antiquity, still carries an antique name—the English translation of the Greek "red-skin", "St. Anthony's Fire". As with numerous skin conditions, its title describes a physical appearance rather than the pathological basis. While the name has not changed with the centuries, the treatment has. There were the days of Liq. Ferri Perchlor, XX t.i.d., followed by the custom of using ichthyol in aqueous solution 20 per cent, as an ointment or 3 i ichthyol to ℥ i. Now erysipelas antitoxin is used. The results depend upon the specificity of the preparation used for the particular strain of streptococci causing the infection.

For the past fifteen years the writer has used nothing but the ultra-violet ray, and has never needed more than five treatments. The dosage is heavy, 15 to 30 minutes the first treatment, at a distance of 24 inches. The patient will experience a sense of relief within three or four hours. Daily exposures are given for the next three or four days. In treating erysipelas of the face no protection for the eyes is required other than having the patient keep the eyelids closed tightly.

A NEW DIAGNOSTIC INTRADERMAL REACTION WITH BOWEL ANTIGEN: INDICATING THE PRESENCE OF VIRUS OF VENEREAL LYMPHOGRANULOMA IN INTESTINE AND DIFFERENTIATING COLITIS ASSOCIATED WITH THAT VIRUS.

Moses Paulson, with the technical assistance of Betty Kravetz, reports a new technique making possible the practical preparation of bowel antigen and the results of studies with additional bowel antigens, including necessary control studies. The following data establish, it is believed, a practical intradermal diagnostic method with bowel antigen to indicate the presence of the virus of venereal lymphogranuloma or an associated product in the human intestine, as well as a means of differentiating colitis associated with the virus of venereal lymphogranuloma. Intradermal reactions with the antigens were tested in four types of cases—those presenting positive and those presenting negative Frei reactions, with and without colitis. To avoid confusion in designation and to distinguish the bowel antigen and its intradermal response from the Frei antigen and its reaction, the following terminology is suggested: An antigen prepared from bowel material or tissue and its intradermal reactions should be termed "bowel antigen" and "positive (or negative) intradermal reaction to bowel antigen," respectively. A positive response to the antigen indicates the presence of the virus of venereal lymphogranuloma in the material from which the antigen was made. While the indication of the presence of the virus of venereal lymphogranuloma in the intestine is not proof of etiology of the colitis which it accompanies, experimental and clinical evidence strongly suggests this relationship. Criteria for interpretation of the intradermal tests have been developed. By tests with this antigen it is hoped to narrow further the classification of non-specific ulcerative colitis, the cases in which there are indications of the virus of venereal lymphogranuloma in the intestine being separated from those in which there are not, suggesting differences in clinical approach. —*J. Am. M. Ass.*, 1937, **109**: 1880.

SHORT-WAVE DIATHERMY IN WHOOPING-COUGH.—K. R. v. Roques reports 49 cases of whooping-cough cured by means of short-wave diathermy. Both chest and neck were treated at each sitting, each for about ten minutes. All the cases were cured. The average duration of the treatment was about a fortnight. Recurrences were treated in the same way. Medicinal treatment was carried out in addition whenever necessary.—*Med. Welt*, September 4, 1937, p. 1240. Abs. in *Brit. M. J.*

Editorial

ACUTE APPENDICEAL OBSTRUCTION

IN the present number the *Journal* publishes an article by Dr. E. H. Wood, under the title of "Acute Intestinal Obstruction—Appendiceal". The general tenor of Dr. Wood's thesis is to support the views of Sir David Wilkie concerning a more precise diagnosis in cases of "appendicitis", views which are now generally known. Wilkie's first article on the subject appeared in 1914, since when he has published several other contributions to the same subject.

The essential points that Sir David has made are that, first, there exists a pathological condition, ordinarily called appendicitis, which is primarily nothing more than an acute obstruction of the appendix; a condition which may give rise to secondary inflammation of the organ or not, largely according to the amount of fæces retained in the appendix behind the obstruction. Secondly, that this form must be clearly distinguished from the ordinary form of primary acute appendicitis; and, thirdly, that the essential difference between the two forms lies in the fact that pure obstruction does not give rise to fever or elevation of pulse rate during the first few hours of the attack, whereas primary appendicitis does do so. The importance of making the diagnosis between the two forms lies, as Wilkie emphasizes, in this; that the practitioner, finding pulse and temperature practically normal, may be induced to wait for changes in these respects before deciding that operation is necessary, while all the time the primary obstruction may be giving rise to "fermentative" changes in the obstructed portion, which may go on shortly to perforation. His rule, therefore, is to ignore the state of the temperature and pulse rate in the early stages, and base the diagnosis entirely on the facies and the local examination of the abdomen.

Dr. Wood, who apparently is a stout supporter of Sir David's teaching, gives us in this article the result of a questionnaire, which he addressed to nine medical schools in Canada, the United States, and Great Britain. The answers received must be read in the original. The important point for us is that Dr. Wood finds that Wilkie's teaching is not accepted and is not being given to students in Canada, and he feels that this is a pity and that Wilkie's "remarkable contribution is not bearing the fruit it deserves".

There is no doubt that Wilkie's observations confirm impressions, indeed opinions, already formed by a great many surgeons, to the effect that obstruction of the lumen is extremely apt to provoke acute inflammation in the distal portion of the appendix, and Dr. Wood's article calls particular attention to this fact, but it may legitimately be doubted whether the somewhat hard and fast rules of Wilkie's teaching are either, in many instances, correct, or that his pathological observations offer a sound basis for these rules. The mere absence of fever and rise of pulse rate during the first few hours cannot always be accepted as evidence that the condition is purely obstructive and that infection is absent. Moreover, in our experience, a definite colicky pain, accepted by Wilkie as one of the chief points in the diagnosis of appendicular obstruction, is rarely complained of at the onset. There are too many exceptions to these rules to make them valid for judgment; yet they have their value as confirming the one generalization upon which most surgeons are agreed—that, for safety's sake, an acute onset of pain which can be diagnosed as being due to some disturbance in the appendix calls for operation as an emergency, regardless of the state of the pulse and temperature.

In general, we agree with the opinion from Scotland, as given in Dr. Wood's paper, and the final sentence of that opinion constitutes the justification for Wilkie's teaching, and represents perhaps the most valuable point in the paper. Nevertheless, Dr. Wood's contention that the Canadian schools are derelict in that they apparently do not formally instruct their students in Wilkie's

teaching is hardly justified. It is possible that Canadian schools are not "against" this teaching, but rather lay a general emphasis upon the danger of delay in any case of appendicitis because of possible pathological conditions involving danger (including the primary obstructive type), while at the same time disagreeing with the correctness of the view that there exist clinical indications definitely pathognomonic of the primary obstructive type.

In spite of these theoretical considerations Dr. Wood's article is to be commended in that it brings to the mind of the general practitioner the possibility of the primary obstructive type, and the particular danger of delay when this type is suspected to be present. This is true even if one is inclined to disagree with his explanation of the pathological changes occurring in "closed" appendicitis, and to regret his lack of emphasis upon the quite clear symptoms suggestive of the onset of gangrene. Comparatively few obstructed appendices go on to gangrene and perforation, although gangrene is the particular danger that is to be feared when obstruction does occur. The important point, therefore, seems to us to be to educate the practitioner, first, in the idea that obstruction may have occurred, and in the attempt to diagnose that condition early, but, secondly, also, in the interpretation of the actual signs and symptoms of gangrene and threatening perforation in such cases as are seen by the practitioner comparatively late. The symptoms of gangrene, when already constituted, are, briefly, subsidence of the initial acute pain without coincident fall in temperature and pulse rate, rather with a rise in the pulse rate, fever being uncertain. This lack of correlation between pain and pulse rate demands immediate operation.

EDWARD ARCHIBALD.

PHYSICIANS' RESPONSIBILITY FOR NORMAL NUTRITION

NO science has made greater advances during the past twenty-five years than that of human nutrition. Before 1912 the physician's main concern was to see that his patient received a proper supply of fats, carbohydrates and proteins; very little was known of the importance of the minerals, and the word "vitamin" was then unknown. Now we know that of the twenty-two amino acids commonly present in protein, ten are essential, and life could not exist without twelve minerals and at least six vitamins.

In the past the goal of the physician and public health worker has been to see that the population enjoyed average health and did not suffer from under-nutrition, or marked malnutrition. Recent observations on animals[1] show that, starting with a diet already considered adequate, the feeding of additional amounts of certain food elements increases the rate of growth of the animals, maintains their youthful appearance longer, and lengthens their span of life. Carefully conducted studies in Canada have indicated that our present dietary customs may result in many persons not receiving amounts of some of the food elements commensurate with the highest attainable level of health. Unfortunately, the practical application of facts concerning nutrition has not kept pace with our increasing knowledge. The practising physician is so absorbed with the problem of diagnosis and treatment of disease that frequently the question of diet is more or less pushed into the background. The physicians of Canada must increase their interest in this problem of normal nutrition, otherwise the public will seek information on this subject elsewhere.

The Canadian Medical Association has long been interested in this subject, and this interest has crystallized in the formation of a Committee on Nutrition. With a view of presenting very briefly and in a practical manner proved facts concerning what the normal person should eat, and the reasons why, the Committee is obtaining for the *Journal* a series of short, practical, authoritative articles on normal nutrition, which will appear each month during the coming year. This is being done in the belief that the physician can apply these

1. SHERMAN, H. C. AND CAMPBELL, H. L.: Nutritional well-being and length of life influenced by different enrichments of an already adequate diet, *J. of Nutrition*, 1937, **14**: 609.

facts with benefit to every patient who consults him for any cause.

Further, in order to bring to the attention of the public the importance of nutrition in relation to health, the Committee is arranging a series of addresses to be given across Canada by outstanding scientists of this continent and Great Britain. These addresses will also be of interest to the medical profession. The first address will be given in Ottawa, our capital city, and broadcast across Canada, on the evening of Saturday, February 19th, by E. V. McCollum, M.A., Ph.D., Sc.D., Professor of Biochemistry, Johns Hopkins University, one of the outstanding nutritional workers on this continent. Professor McCollum will give an address in Winnipeg the following week, and at intervals during the year other speakers will be heard in various centres throughout Canada.

It is hoped that the efforts of the Committee will result in a more general application of our present knowledge of normal nutrition by the physician in his every day practice. This, combined with an increased interest of the lay public in the subject of nutrition and a desire on their part to obtain authoritative information free from fads and fallacies, will result in a higher level of health for the Canadian people.

F. F. TISDALL AND T. G. H. DRAKE.

Editorial Comments

Canadian Broadcasting Regulations

The Canadian Medical Association has always been interested in the character of the programs coming over the radio — in particular those advertising drugs, proprietary preparations, medical treatments, and concerning matters bearing upon Public Health. It is obvious that the radio affords an ideal medium for the propagation of fads, fancies, and "information" of an undesirable and even dangerous character. Truths, half truths, and whole lies may come over, to the possible detriment of the listening public, who in many cases are not in a position to assess the value of the statements they hear. Hence the importance of the regulation of radio broadcasts. We welcome, therefore, "Regulations for Broadcasting Stations made under the Canadian Broadcasting Act, 1936, Chapter 24, I Ed. VIII, S. 22", a copy of which reached us a short time ago through the courtesy of Major Gladstone Murray. These regulations seem to us very satisfactory, inasmuch as, even though the subjects we have mentioned are not dealt with in minute detail, the powers conferred on the Canadian Broadcasting Commission seem to be ample for the satisfactory control of the situation. We quote certain portions which will have a special interest for medical readers. The Foreword states "These regulations are designed to maintain and improve the standard of broadcasting in Canada".

In regard to policy the Corporation sets forth its principles thus. "It is not the intention of the Corporation to restrict the freedom of speech nor the fair presentation of controversial material. On the contrary, the policy of the Corporation is to encourage the fair presentation of controversial questions. At the same time, it should be realized that the message of broadcasting is received at the fireside in the relatively unguarded atmosphere of the home, reaching old and young alike. Certain subjects, while meriting discussion elsewhere in the public interest, are not necessarily suitable for this intimate medium."

Section 7 reads as follows.

No one shall broadcast

(a) Anything contrary to law;

(b) The actual proceeding at any trial in a Canadian Court;

(c) Abusive comment on any race, religion or creed;

(d) Obscene, indecent or profane language;

(e) Malicious, scandalous, or defamatory matter;

(f) Advertising matter containing false or deceptive statements;

(g) False or misleading news;

(h) Upon the subject of birth control;

(i) Upon the subject of venereal disease, or other subjects relating to public health which the Corporation may from time to time designate, unless such subjects be presented in a manner and at a time approved by the General Manager as appropriate to the medium of broadcasting;

(j) (i) Programs presenting a person who claims supernatural or psychic powers, of a fortune-teller, character analyst, crystal-gazer or the like, or programs which lead or may lead the listening public to believe that the person presented claims to possess or possesses supernatural or psychic powers or is or claims to be a fortune-teller, character analyst, crystal-gazer or the like.

(ii) Programs in which a person answers or solves or purports to answer or solve questions of problems submitted by listeners or members of the public unless such programs prior to being broadcast shall have been approved in writing by a representative of the Corporation.

Section II (i) In any program no one shall advertise

(e) Spirituous liquors;

(f) Wine and beer in any province of Canada wherein the provincial law prohibits the direct advertisement of wine and beer, nor in any other province unless immediately prior to the coming in force of these Regulations wine and beer have in fact been directly advertised in such province through the facilities of radio.

There are other special regulations applying to this matter.

Section 13 reads.

1. No continuity advertising an article marketed under the Proprietary or Patent Medicine Act or the Food and Drugs Act may be broadcast until it has been approved by the Department of Pensions and National Health. Continuities submitted for approval shall be forwarded, in duplicate, to the Canadian Broadcasting Corporation, Ottawa, at least two weeks in advance of intended use. The formula for any article bearing a distinctive or trade name distinguishing it from any other product, and marketed under the Food and Drugs Act, shall be submitted with each pertinent continuity.

2. No electrical transcription advertising an article marketed under the Proprietary or Patent Medicine Act or the Food and Drugs Act shall be broadcast by any station unless certified by an affidavit that the advertising continuity has been approved by the Department of Pensions and National Health.

3. No announcer may broadcast any statement concerning any article marketed under the Food and Drugs Act or the Proprietary or Patent Medicine Act that is not contained in the continuity approved by the Department of Pensions and National Health.

4. Testimonials referring to an article marketed under the Food and Drugs Act or the Proprietary or Patent Medicine Act shall be regarded as constituting part of the advertising continuity.

5. No continuity recommending any treatment for any ailment shall be broadcast until it has been approved by the Department of Pensions and National Health.

6. Inspectors of Food and Drugs, Department of Pensions and National Health, are authorized to act as representatives of the Corporation for the purpose of enforcing this regulation.

Thus it would seem that the Canadian Broadcasting Corporation has ample powers to deal with the abuses we have in mind. Where our Association has any fault to find or comment to make, then, it should make representations to the central authority at Ottawa, where, we believe, our views will receive careful consideration.

An appreciative editorial in the issue of the *Journal of the American Medical Association* for November 6, 1937, concludes as follows: "Thus we shall receive from our northern neighbour radio broadcasts of purity in contradistinction to the quackery, fortune teller and 'patent medicine' promotion that comes floating like a foul effluvium across the Rio Grande. The new Canadian broadcasting regulations may also serve as a suggestion much needed by our own broadcasting chains." A.G.N.

The Late Lawrason Brown, B.A., M.D., D.Sc.

We regret to have to announce the death, on December 26, 1937, of Dr. Lawrason Brown, of Saranac Lake, N.Y. For years he was Resident Physician in charge of Trudeau Sanatorium and did much by his personal research to enhance its steadily growing reputation. Brown's name was a household word in America among those who have devoted themselves to the study of tuberculosis.

Doctor Brown was a graduate of Johns Hopkins University, taking his B.A. degree in 1895 and his M.D. in 1900. In the latter year he became assistant resident physician to the Trudeau Sanatorium, in 1901, resident physician, in 1912, visiting physician, and eventually consulting physician. From 1916 onward he was an instructor in the Trudeau School of Tuberculosis (in the establishment of which he took the leading part), a training school for physicians started in 1916 under the Edward I. Trudeau Foundation. He was a member of the board of trustees of the Trudeau Sanatorium and several other institutions, and was on the advisory council of the Henry Phipps Institute of the University of Pennsylvania. He had been, at various times, president of the American Clinical and Climatological Associations, the American Sanatorium Association, and the National Tuberculosis Association. He was a Fellow of the American College of Physicians, and a member of the Association of American Physicians, the American Association of Thoracic Surgery, the American Association for the Advancement of Science, and the American Public Health Association. The National Tuberculosis Association awarded him the Trudeau Medal in 1933 in recognition of his distinguished work in the study of tuberculosis. He received the honorary degree of D.Sc. from two colleges, Dartmouth, in 1931, and the Medical College of Virginia, in 1936.

Doctor Brown wrote much on his chosen specialty, usually from the diagnostic, therapeutic and public health side, but he also did good work of a research character. He investigated the tubercle bacillus itself, the place of tuberculin in diagnosis and treatment, and the question of complement fixation in tuberculosis. He was one of the pioneers in the application of the roentgen ray to early diagnosis.

He was also the author of "Rules for Recovery from Tuberculosis", "Intestinal Tuberculosis" (with H. L. Sampson), and "The Lung and Tuberculosis" (with F. H. Heise). He contributed articles to Osler and Macrae's "Modern Medicine", Tice's "Practice of Medicine", Klebs' "Tuberculosis", Cecil's "Textbook of Medicine", and Blumer's "Therapeusis of Internal Diseases". A.G.N.

Men and Books

A FEW ANATOMICAL NAMES

BY W. A. MCFALL, *Toronto*

Names are always interesting and anatomical ones are especially so. When men of the ancient civilizations wished to attach a name to an organ or structure of the body they sought out some familiar object—something in the world of nature which had to it a resemblance in form, outline, or supposed function, and thus a name was created. Daily we use these terms, but are many times forgetful of their meaning and origin. For example, the familiar name *conjunctiva* is used for the outer membrane of the eye. Now "conjunctiva" means "conjunction". What does the membrane conjoin? The conjunctiva by its extension and continuity through the lachrymal duct connects the eye with the nose. With the meaning of the name kept in mind, we at once appreciate why our patients frequently develop a conjunctivitis subsequent to a disturbance of the nasal passages.

When the ancients looked at the first cervical vertebra with the head resting on its shoulders, they thought of the mythological figure who carried the world upon his back and so the vertebra was named *Atlas*. But when they looked at the distal extremity of the spinal column with its curved end they were reminded of the beak of the cuckoo, and so that portion of the anatomy was named *coccyx*, which means cuckoo. But another bird was thought of when a process of the scapula was to be designated, and so the process was named *coracoid*, which means "like a crow". Even the despised goat was not overlooked. When the wise men looked just within the outer ear they saw a small eminence from which was growing a tuft of hair, and thus it was called the τράγος, which is the Greek word for goat. It is interesting to note that this word is related to our English words, "tragic" and "tragedy"—tragedy meaning "song of the goat". The thin middle covering of the brain with its thread and strands had the appearance to them of a spider's web, and so it was called *arachnoid* which means "like a cobweb". Very strangely, the bone projecting out behind the ear reminded them of the breast and the nipple of the breast, and for this reason it received the name *mastoid*, which word is cognate with the words "mastitis" and "mastodynia". But when the wise men looked at the pelvic bone, they were puzzled; nothing in the earth, air or sky had any resemblance to it and so it received the unique title of *os innominatum*, or "the bone without a name". The fossa of the pelvic bone in which the head of the femur reposes was, however, not so difficult to name. In shape it looked like a vinegar cruet and so received the title *acetabulum*, which word is cognate with the words "acetic acid" and "acetate". "Tonsil" has the vague meaning of a "sharp stake". The other name for the same gland is *amygdalum*, which is very apt as it means "an almond"; the old textbooks on the practice of medicine always gave "amygdalitis" as a synonym for "tonsillitis". "Œsophagus" means "a carrier of food". Stomach is derived from *stoma*, and means "a little mouth". Why little? Probably in the sense of secondary. *Pylorus* is from a Greek word which means "gate-keeper" or "warder". It opens and closes the gate when necessity demands. *Sphincter* means "shut tight". *Duodenum*, as is well known, is the Latin word for twelve. It does not mean, as commonly expressed, twelve inches but twelve finger-breadths, which makes the duodenum eight to ten inches in length (Gray). One modern writer states that the first four measures are the field of the surgeon; the middle four the domain of the physician; and the last four belong to the patient.

Jejunum means "empty", and is so called because that portion of the gut is frequently found empty. In English we have a related word "jejune", which means void of material or substance, and is sometimes used in reference to medical papers or political speeches, especially those of the opposing party! *Ileum* means "turned or twisted", and is thus well named. *Colon* means the largest intestine. "Sigmoid flexure" derives its name from its resemblance in outline to the Greek letter *sigma*. In anatomy other Greek letters are honoured, as in the names "deltoid" muscle and "lambdoidal" suture. *Rectum* means "straight", but it is not quite so straight as its name indicates. "Testicle" means a small witness or testament; it testifies to the individual's sex. The other name for the same organs is *didymi*, which means a pair, or twins. When Scripture refers to Thomas named Didymus it no doubt indicates that he was a twin. The term *epididymis* and *epididymitis* used in reference to the adjoined gland and an inflammation of it are the almost exclusive terms applied, but *didymitis* is rarely used and in its place we have the word *orchitis*, Greek in origin. *Uterus* is of uncertain origin, and simply means "womb". An inflammation of the uterus is described by the term *metritis*, which is derived from "metre", a measure —the womb, by its periodical menstrual flow, is a measurer of time. When the surgeon removes the uterus, he employs the term *hysterectomy*. This word is of interest in that it is related to "hysteria". The syndrome known as hysteria

was supposed to be caused by a disturbance of the uterus. The conclusion of the ancients may have been right. "Fallopian tube" is named for Fallopius, the great Italian anatomist of the 16th century. "Ovary" is derived from *ovum,* which means "an egg". The word "gland" is derived from the Latin *glandula,* a diminutive of *glans,* an acorn, from a fancied resemblance of certain of these structures to an acorn. If a gland resembles a bunch of grapes, it is called a "racemose" gland. The thymus gland is so called because of its resemblance to a bunch of thyme. The pancreas derives its name from its appearance, *pancreas* meaning "all flesh". The word "liver" is of doubtful origin, but it is generally agreed that the Anglo-Saxon word *lifer,* German *leber,* Icelandic *lifr,* Scandinavian *lever,* come from the same root as English "life", German *leber,* possibly meaning the liver as "the seat of life". The Greek word for "liver" was ἧπαρ. The Greeks however were not interested in the anatomy and histology of the liver; they viewed it psychologically, believing it to be the seat of two great emotions—love and anger. They doubtless had observed the relation between a man's outlook upon life in general and the state and functioning of his liver. The Romans in their scientific works simply transcribed the word ἧπαρ (genitive, ἥπατος) it becoming the familiar Latin word *hepatica.* The word for "liver" in common use among the Romans was *jecur.* In process of time it became the custom to feed animals figs in order to produce for eating large and sweet livers. Thus the liver became known as *jecur ficatum,* or the liver of an animal fed upon figs. After a time, the word jecur was dropped and the liver was known simply as *ficatum.* The Italian word for liver is *fegato.* In the case of the French, *ficatum* was contracted to *foie,* as in "paté-de-foie-gras", and "huile-de-foie-de-morue". Thus we have the interesting fact that in the Latin countries the word for liver is not derived from the organ itself but from the sweet and toothsome fig.

In English we call the smallest finger of the hand simply the "little finger", but the French call it *auriculaire* because of the custom of using it to poke the ear. Watch a body of men at the close of a tiresome meeting, and observe how apt is this name. While the English call the first finger "thumb", because it is thick, the French call it *pouce,* which means an inch. This arose from householders using as a measuring rod the distal phalanx which has an approximate length of one inch. The words "phalanx" and "phalanges" reflect the military genius of the Greeks. The digits, with their rows of bones, reminded them of an army in battle array. Thus, when we hold up our hand before our face we can view a solid phalanx. Very interesting in origin is the word "muscle". The creeping motion of a muscle under the skin had the appearance of a mouse crawling, and thus the word is derived from the Latin *musculus,* a little mouse. That same creeping motion was the basis of the good old nursery rhyme "One little mouse runs up the arm, two little mice run up the arm, etc." The longest muscle of the body has the clever title of *sartorius,* from *sartor,* a tailor, who in assuming his characteristic pose does so by the aid of the sartorius muscle. The muscles attached to the chin are named *genio,* as *genioglossus, geniohyoideus,* etc. *Genio* is derived from the Latin *gena,* meaning chin. Our English word genial is also derived from the same Latin word. We display our geniality by our chin. The two great muscles *gastrocnemius* and *soleus* unite, and are extended into the *tendo Achillis* which is attached to the *os calcis. Gastrocnemius* is from *gaster*—belly; it gives the belly form to the calf of the leg. Soleus derives its name because it is the shape of the sole (fish). Achilles, the ancient Greek, was armed to the teeth and almost invincible, but he was vulnerable in one place, the heel. *Calcis* means "a spur". The dome of the skull is known as *calvarium* which is interesting in relation to the word "calvary". The bottom of the foot is known as the sole because it is flat. Thus we have proceeded from soul to sole with many intermissions which can be completed at another time.

Association Notes

CANADIAN MEDICAL ASSOCIATION ANNUAL MEETING, HALIFAX, N.S., JUNE, 1938

LOCAL COMMITTEES

Honorary Local Secretary—DR. C. M. BETHUNE.

COMMITTEE ON LOCAL ARRANGEMENTS

General Chairman.—DR. H. K. MCDONALD.

Secretary.—DR. C. M. BETHUNE.

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Chairman.—Dr. S. R. Johnson.
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Chairman.—Dr. R. E. Mathers.
Secretary.—Dr. R. H. Stoddard.

SECTION OF OBSTETRICS AND GYNÆCOLOGY

Chairman.—Dr. E. K. McLellan.
Secretary.—Dr. W. G. Colwell.

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Chairman.—Dr. F. G. Mack.
Secretary.—Dr. G. A. Winfield.

SECTION OF PÆDIATRICS

Chairman.—Dr. G. Wiswell.
Secretary.—Dr. N. B. Coward.

SECTION OF ANÆSTHESIA

Chairman.—Dr. W. L. Muir.
Secretary.—Dr. A. E. Murray.

SECTION OF RHEUMATIC DISEASES

Chairman.—Dr. J. W. Merritt.
Secretary.—Dr. J. C. Acker.

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Chairman.—DR. H. G. GRANT.
Members.—Drs. A. L. McLean, J. W. McIntosh, E. A. Brassett, Hugh McKinnon, T. M. Sieniewicz, Murray McKay, J. J. McRitchie, W. J. Keating.

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Chairman.—DR. A. G. MCLEOD.
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PUBLICITY COMMITTEE

Chairman.—DR. H. L. SCAMMELL.
Members.—Drs. C. S. Morton, A. L. Murphy and H. B. Atlee.

SCIENTIFIC EXHIBITS COMMITTEE

Chairmen.—DR. R. P. SMITH AND DR. D. J. MCKENZIE.
Secretary.—DR. E. F. ROSS.
Members.—Drs. V. O. Mader, V. N. McKay, G. A. McIntosh, E. T. Granville, M. Jacobson, F. G. Mack, G. Donovan, J. G. D. Campbell.

TRANSPORTATION COMMITTEE

Chairman.—DR. P. A. MCDONALD.
Members.—Drs. H. W. Kirkpatrick, T. B. Acker, A. E. Doull, Jr., W. D. Rankin, K. P. Hayes and R. C. G. Hawkins.

FINANCE COMMITTEE

Chairman.—DR. W. L. MUIR.
Secretary.—DR. C. W. HOLLAND.
Members.—Drs. H. G. Grant, M. G. Burris, A. Calder, J. G. MacDougall, A. E. Doull, Sr. and D. J. McDonald.

COMMERCIAL EXHIBITS COMMITTEE

Chairman.—DR. J. V. GRAHAM
Members.—Drs. A. E. Murray, R. H. Stoddard and G. L. Covert.

THE SCIENTIFIC EXHIBIT

One of the features of the convention will be a section reserved for a scientific exhibition of subjects of medical interest. It is the desire of the Committee in charge of this feature to make it representative of every field in medicine, and anyone wishing to provide an exhibit is requested to communicate as soon as possible with Dr. R. P. Smith or Dr. D. J. McKenzie, Pathological Institute, Morris Street, Halifax, who will be glad to furnish any information regarding this feature, as well as application forms for space and regulations for exhibitors.

The 1938 Convention in Halifax promises to be another notable stepping stone in the history of the Canadian Medical Association. Since the re-organization convention of 1921 Halifax has grown, and no small part has been the erection and operation of two large and up to date hostelries.

The Nova Scotian Hotel at the Halifax Ocean Terminals, our Headquarters, is a real Convention Hotel operated by the Canadian National Railways, and its spacious rooms will lend themselves excellently to the General Sessions and the Sectional Meetings, with ample room for Commercial and Scientific Exhibits.

The Lord Nelson, another modern hotel, will be the headquarters of the Canadian Public Health Association for their Annual Meeting on June 20th and 21st, but it will also be the home of many of you during your stay in Halifax. Facing the beautiful Public Gardens it is within easy access both to the business district and to the Headquarters Hotel where all the meetings will be held.

The Carleton Hotel, known as the "Home-like Hotel", is smaller, but visitors will find it lends itself to making their stay pleasant. It is situated just one block from the busy business section, and, again, is only a short distance from the Convention Hotel.

The Halifax, one of the older hotels, still maintains a fine reputation and guarantees its visitors to the Convention every comfort.

The Queen Hotel also has a long reputation as a hotel of quality, and many will find it a pleasant home during their stay. The two hotels last mentioned are only three blocks from the Convention Hotel.

Your Housing Committee advises you to write early for your reservations direct to the hotel of your choice. If that hotel is already booked to capacity, we will do our best to obtain for you the next best accommodation available, but do not delay. MAKE UP YOUR MIND TO BE IN HALIFAX IN JUNE.

Nova Scotian Hotel, 100 double rooms, $5.00-$6.00.

Lord Nelson Hotel, 100 double rooms, single $3.00; double $5.00 up; suites $8.00 up.

Carleton Hotel, 25 rooms, single $1.50 up; double $3.00 up.

Halifax Hotel, 75 rooms, single $2.00 up; double $3.50 up.

Queen Hotel, 75 rooms, single $1.50 up; double $2.50 up.

Hospital Service Department Notes

Anæsthesia Instructions to Interns

An excellent outline of instructions to interns, covering duties, etc., has been prepared by the department of anæsthesia of the Regina General Hospital. Responsibility is outlined, the intern is told what pre-operative study must be made of the patient, and there is a brief description of the methods of administration of the various anæsthetics. A list of pertinent "rules of thumb" are appended. These last, particularly, should be in the hands of every intern.

The Relations of Hospitals and Radiologists

A report on the existing financial arrangements between radiologists and hospitals has been issued recently by the Council on Professional Practice of the American Hospital Association. This was based on a tabulation of the returns from some 2,700 hospitals in the United States and Canada to the American College of Surgeons.

Of these hospitals (and they are a fair cross-section of the medium-sized and larger general hospitals) 94 per cent of those reporting ownership stated that the equipment was owned by the hospital. With respect to the financial arrangements between the radiologists and hospitals it was found that of the 1,571 hospitals replying to this particular question in 47.8 per cent the radiologist was on salary (full-time or part-time), in 40.8 per cent he received a percentage of the income, in 6.6 per cent the basis was concession or rental, and in 4.8 per cent no payment was made to the radiologist.

The reports have been further classified in terms of the type and size of hospitals and the size of the cities in which the hospitals are located. In general it was found that the proportion of salary arrangements increases with the size of the hospital. Thus with hospitals of 250 beds or over 71 per cent of the 354 hospitals of this size reporting had a salary arrangement with their radiologists. With hospitals of between 100 and 250 beds 48 per cent of the 629 reported a salary basis. With the 334 hospitals between 50 and 100 beds reporting the proportion was 40 per cent. Of the hospitals of between 25 and 50 beds a large proportion did not answer this question, but of the 174 responding, 35 reported a salary basis. Classification of the cities by size revealed a parallel analysis; in cities of over a million 76 per cent reported a salary arrangement; in cities of from 10,000 to 25,000 this figure had dropped to 34 per cent.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

New England Medical Centre for Rural Physicians

An institution known as the Joseph H. Pratt Diagnostic Hospital, so named in honour of the professor of clinical medicine at Tufts College Medical School, will be erected by the Boston Dispensary with the primary purpose of helping the practice of rural medicine. Special arrangements are being developed to make accurate diagnosis more readily available to the rural patient and the physician. The special problems of rural practice will be studied; rural physicians may take turns studying at the Pratt Hospital, and their expenses in Boston will be paid by Mr. William Bingham 2nd, the donor of the new hospital. Exchange doctors will be provided to substitute for them in their home towns.

Medical Societies

The Canadian Ophthalmological Society

At a recent meeting held in Toronto the Canadian Ophthalmological Society adopted a Constitution and By-laws. Dr. W. Gordon M. Byers' untiring work in connection with the formation of the Society has been rewarded by a membership of sixty of the leading practitioners doing eye work, and representing every province in the Dominion.

The following officers were elected: *President,* Dr. W. Gordon M. Byers; *Vice-president,* Dr. W. H. Lowry; *Secretary-Treasurer,* Dr. Alexander E. MacDonald; *Members of the Council,* Drs. F. T. Tooke, Colin Campbell, J. Vaillancourt, E. A. McCusker, L. de V. Chipman.

A. E. MACDONALD,
Hon. Secretary-Treasurer

Montreal Physiological Society

This Society met on December 20, 1937. Abstracts of two papers read follow.

A NEW METHOD FOR DEVELOPING A BETTER COLLATERAL BLOOD SUPPLY TO THE HEART (Preliminary Report).—M. Fauteux.

Dr. Fauteux explained the physiological principles on which he had devised a new surgical procedure for increasing the coronary circulation in coronary diseases. He calls this operation "segmentary coronariectomy", associated with ligation of the companion vein. When the operation was performed on dogs the mortality was nil and there was no clinical evidence that the coronary circulation was altered. As soon as the actual experiments have been completed a full report of this experimental work with clinical observations, electrocardiographic curves, and histological data will be presented. Then only will it be possible to draw definite conclusions and to judge the real value of this method.

AN HYPOTHETICAL CONVULSIVE MATERIAL IN THE BRAIN SUBSTANCE OF ANIMALS WHICH HAVE HAD CONVULSIONS.—H. M. Keith and D. McEachern.

In 1933 Kroll made the claim that convulsions could be produced in normal animals by the intravenous injection of extracts of brain removed from convulsing animals, while the extract from normal animals was said to be without convulsive properties. Most of these experiments were carried out in cats. The minced brains were extracted with acetone and the remaining residue suspended in saline, extracted, and filtered. This saline extract was used in the experiments. Holmes repeated these experiments, using the acetone fraction of the extract. He noted a marked constitutional effect. This frequently occurred with or without convulsions. Extracts of normal brain as well as those from the brains of convulsing animals sometimes produced convulsions, and both were equally lethal.

In the present work the experiments were repeated, using both the saline extract of residue as decribed by Kroll and the saline suspension used by Holmes. Twenty-five injections of brain extracts were made intravenously in 19 animals in an attempt to produce convulsions. Following six of these injections there was slight convulsive movement only. Twenty of the twenty-five injections resulted in marked generalized symptoms, such as described by Holmes. These severe generalized symptoms followed the injection of extracts from normal brains and extracts from convulsed brains. These experiments, then, offered no support to Kroll's claim. They did not, however, rule out the occurrence of some unrecognized convulsing substance whose effects may have been masked by the marked general symptoms. It is also quite possible that some convulsive substance might have appeared with explosive rapidity and disappeared quickly, before the extract could be made.

J. F. MCINTOSH

The Moose Jaw and District Medical Society

This Society held a November dinner meeting in the Grant Hall Hotel. About thirty were present. After dinner two films were shown by Mr. Ryan, of the Smith & Nephew Company. One dealt with the treatment of fractures and the other with the injection treatment of varicose veins and ulcers.

Dr. Lennox Bell, of Winnipeg, then gave a paper on "Recent advances on therapeutics". He dealt with the use of sulphanilamide in infections, anti-pneumococcal serum in pneumonia, and the recent work in vitamin therapy. He stressed the importance of proper dosage in the

use of sulphanilamide and referred to its indications and limitations. He emphasized the importance of "typing" the sputum in pneumonia and the great reduction of mortality when the serum is used in properly selected cases and given early. The paper was very well received and commented on most favourably.

LILLIAN A. CHASE

Prince Albert and District Medical Association

Dr. Willard S. Holmes, of Saskatoon, gave a paper on "Toxæmias occurring late in pregnancy", at the December dinner meeting. He stressed the importance of watching for gain in weight of more than 25 pounds, rise of blood pressure past 140, and albumin in the urine as the earliest indications of pre-eclamptic and eclamptic conditions. He made a plea for more adequate pre-natal care, and pointed out from his own statistics that the only occasions he had seen eclampsia were in patients receiving no supervision prior to the onset of convulsions. The management of these cases was outlined. Eclampsia is an arteriolar disease. The need for watching the eye grounds was stressed, as they usually gave the first indications of the approach of severe toxæmia. Dr. Holmes stated that operative procedures, such as Cæsarean section, had no place in the management of the eclamptic patients.

Dr. Iva C. Molony, who has been transferred from Fort Qu'Appelle Sanatorium to the Prince Albert institution, was welcomed to the Association. Surgical moving pictures of "Depressed skull fracture" and "Repair of inguinal hernia" were shown. LILLIAN A. CHASE

The Regina and District Medical Society

The members of this Society presented a silver water pitcher to Dr. Hugh MacLean before his departure for California. Dr. MacLean has practised twenty-nine years in Saskatchewan. He has been active in medical societies, having been president of the Regina and District Medical Society, president of the Staff of the General Hospital, and president of the Staff of the Grey Nun's Hospital. Dr. Charles May expressed the regret of the members at Dr. MacLean's departure.

Dr. L. H. McConnell, Saskatoon, spoke on "Diagnosis and treatment of intracranial lesions". The brain is the fourth commonest location for tumour. The commonest is the uterus; second, the stomach; third, the breast; and fourth, the brain. Eighteen per cent of patients with brain tumour have no headache. Many patients diagnosed as having "stroke" on further investigation prove to have brain tumour. A patient waking up with headache should be carefully investigated for brain tumour. Papillœdema is a most important symptom. As soon as intracranial pressure is increased pressure of the disc appears. The pulse rate is not often altered very much except in brain abscesses. Frontal lobe tumours affect the judgment and personality of the patient. It is Dr. McConnell's opinion that 4 per cent of all patients in the mental hospitals have brain tumour. In temporal lobe tumour, if it is on the left side, there is a speech upset, the patient may complain of unpleasant smells, and may have dreamy states and a sense of unreality. With the parietal lobe tumour there is a sensory upset. Occipital tumour is the rarest. With it there is a visual upset. A cerebellar tumour is not difficult to diagnose if purely cerebellar. The patient also gets hydrocephalus. If it is near the nuclei there is a nystagmus. If the general practitioner can diagnose the presence of a brain tumour he is doing very well. The location can be left to the specialist. The specialist must locate the tumour because an operation in the wrong place means a death certificate. A tumour of the third ventricle has few symptoms and can be diagnosed by putting in air. The tumour of the lateral ventricle is not easy to diagnose. With it there are rapid changes in blood pressure. Dr. McConnell was emphatic in stating that air should never be put in by the spinal column in a case showing papillœdema. A spinal puncture should never be done on a brain case. Death has followed on the removal of as little as 3 c.c. of spinal fluid. Air should be put in through the upper part of the occipital region. X-ray plates were shown of interesting cases.

Dr. O. E. Rothwell expressed the appreciation of the members for Dr. McConnell's address.

At a recent meeting of this Society a report was received from the committee on the medical care of city relief patients. They stated that in 1937 the doctors' fees were $30,500; dentists' fees $3,500; hospital bills $48,000; drugs and glasses $14,000; making a total of $96,000. The average monthly number of people on relief in Regina for the first nine months of the year 1937 was 9,333. The cost of drugs was $0.12 per person per month. The provincial government and the federal government pay none of these costs. The entire cost is borne by the tax-payers of the city of Regina. In addition to this burden the tax-payers pay 20 per cent of all other relief costs for these people. The provincial government pays 80 per cent of the costs for food, clothing, and shelter.

A farewell banquet was tendered by the Regina and District Medical Society to Dr. Sydney Larson on the eve of his departure for Rochester, N.Y., where he has gone to take special work in radiology. The members presented Dr. Larson with a silver tray.

LILLIAN A. CHASE

Staff Meeting, Regina General Hospital

At the December staff meeting of the Regina General Hospital appendicitis was discussed. Dr. David Low submitted the following classification for appendicitis: chronic; subacute; acute; catarrhal; (1) suppurative, (2) gangrenous, (3) ruptured, (*a*) local, (*b*) gangrenous, (*c*) abscess.

APPENDICITIS IN REGINA GENERAL HOSPITAL FOR SIX YEARS

	1931	*1932*	*1933*	*1934*	*1935*	*1936*	*Percentage*
Chronic appendicitis	106	107	88	145	130	98	
Deaths	2	–	2	–	2	2	
Percentage	1.88%	0%	2.27%	0%	1.5%	2.0%	1.1%
Acute appendicitis	252	243	276	330	301	225	
Deaths	5	4	4	4	3	3	
Percentage	1.98%	1.64%	1.48%	1.2%	1.0%	1.3%	1.4%
Acute ruptured appendicitis	21	23	22	36	30	21	
Deaths	4	1	1	1	1	–	
Percentage	19.0%	21.0%	18.2%	8.3%	13.3%	5.0%	14.3%
Acute gangrenous appendicitis	13	27	23	35	17	31	
Deaths	1	1	1	1	1	–	
Percentage	7.7%	3.7%	4.3%	2.8%	6.0%	0%	3.4%
Acute gangrenous ruptured appendicitis	21	15	6	10	7	2	
Deaths	4	3	3	2	1	–	
Percentage	19.0%	20.0%	50.0%	20.0%	14.3%	0%	21.3%
Subacute appendicitis	111	149	138	150	167	191	
Deaths	–	2	–	1	1	–	
Percentage	0%	1.3%	0%	0.66%	0.6%	0%	0.44%
Total number of cases	524	564	553	206	652	568	
Total number of deaths	16	15	14	11	12	7	
Percentage	3.0%	2.67%	2.53%	1.56%	1.84%	1.23%	

Dr. H. L. Jackes recommended deferred surgery in cases in which the appendix is already ruptured. He quoted figures to show the highest mortality is on the fourth day after the rupture. If the pulse, temperature and white blood count are increasing, drainage should be instituted.

Letters, Notes and Queries

Panel Practice in Britain

To the Editor:

Dr. W. A. Jones' plea in your January number* for opinions regarding the Panel System from medical men who have had practical experience with the system has inspired this letter.

I studied for higher degrees for two years in England and, as is a common custom, did locum work under the panel system between examinations. My four months' experience in panel practice was without prejudice and was representative of three different localities, *viz.*: (1) a crowded North East London area near the Angel; (2) a suburb of London twenty-five miles from Charing Cross; (3) a depressed mining valley of South Wales. The last was a contract mining practice identical with the situation described by Cronin the *The Citadel.* In his story I relived my experiences in Wales, and I feel that this part of the story is authentic and not dramatized beyond legitimate bounds.

My experience with the panel system would not permit me to agree with the Editor that the merits exceed the demerits. I found that a respectable livelihood can be made by the medical man with a full panel, but only by neglecting careful scientific investigation and treatment of his patients. I know one Canadian who went to England to take higher degrees and who was obliged by economic pressure to take a panel practice. He now has four surgeries, two assistants, and is making more money than he would in Canada. But he has been obliged to forego any pride in scientific care of his cases. The busy panel practice resolves itself into a "Clearing Station". The only major decision made is whether the patient is really ill or not. If he is really ill he is sent to the local hospital, and the expense and responsibility are shifted to that quarter. If he is not considered to be really ill some of the panel prescriptions will be prescribed.

Let us consider the doctor with a full panel of two thousand patients. He will receive five thousand dollars for their care. He may face thirty patients in his office around the small fireplace when he arrives on a cold wintry morn-

* The *Journal*, 1938, **38**: 66.

ing. Could any one doctor adequately investigate these patients' complaints in the allotted time? Again the doctor is reminded that every extra investigation or treatment (beyond the Panel Pharmacopœia) comes out of his five thousand dollars. It is not unnatural that he provides as little as possible. I was informed once, in a half-humorous, half-serious way, that the supply of medicine bottles could be maintained by requesting routine urine specimens, on which we religiously did the "sink test".

Now, it may be that the really ill patient sent to a closed hospital is better treated than he would be by the general practitioner. But if this system were to be universally adopted, I think it would sacrifice the professional prestige of 90 per cent of the medical men in Canada. The English public differs markedly from the Canadian and American public. This is reflected in the manner in which the public patients are treated in the out-patient departments of the large hospitals. In England, I have seen men in a row holding their trousers, awaiting their turn for hæmorrhoidal injections—the doctor seated in a swivel chair. In a New York out-patient department I have seen individual dressing cubicles for patients with flat feet—the doctor running from cubicle to cubicle. The average English panel patient will, unless grossly abused, continue with whatever locum or doctor takes over the panel. He has the option of changing his doctor but rarely exercises this privilege. This is shown by the fact that the purchasing or selling price of a panel is relatively fixed by the number of patients who have contracted with that panel, and the money to purchase such a panel may be borrowed readily from medical agencies as the panel is known to have a definite value. The Canadian public has been educated to an independence and freedom of choice which their staid English cousins would never dream of. Class distinction, which is still definitely in evidence in England, is responsible for this. Our average citizen has a wide education in medical matters, and often the explanation of the condition to the patient and relatives requires as long as the treatment. No such explanation is looked for by the panel patient or his relatives. The doctor's position is established in the panel community and his treatment never questioned.

It is this difference in the people of the two countries which impresses me most as an obstacle to the employment of a panel system in Canada. Any system adopted in this country should be adapted to the demands of our citizens. I mean that the doctor must allot more time per patient, hence have fewer patients, and as a result be paid relatively more per patient if the system is to satisfy the public or recompense the doctor.

I have discussed this matter with twenty or thirty Canadian and Australian students who did panel practice as I did, and I feel that this note is an expression of the feeling of the majority of those men. I may have seen the less fortunate side of panel practice, and I may be mistaken, and would welcome discussion by others who have done panel practice, whether it be corroborative of my views or otherwise.

Peterborough, Ont., January 13, 1938. R. K. MAGEE, B.A., M.D., F.R.C.S.

Abstracts from Current Literature

Medicine

The Criteria for the Diagnosis of Coronary Disease. White, P. D., *New Eng. J. Med.*, 1937, **217**: 783.

Coronary disease has come to imply atherosclerotic changes in the coronary arteries themselves, sufficient to interfere seriously with their function. The criteria for its clinical diagnosis are three in number, and only three: (1) angina pectoris in the absence of luetic aortitis and of extensive aortic valve stenosis or regurgitation; (2) coronary thrombosis that can be clinically recognized; and (3) certain electrocardiographic abnormalities, with or without angina pectoris or recent or old coronary thrombosis.

Angina pectoris is characterized by a feeling of retrosternal discomfort, generally a feeling of oppression or weight, characteristically appearing for the first time on ordinary effort, particularly on walking up grade or hurriedly after meals and in cold weather, lasting a few minutes, and subsiding quickly on resting or following the use of nitrites. It may be high, low or intermediate in position. It may radiate to one arm or both. Any other kind or circumstance of anterior chest pain is to be interpreted as angina pectoris only after the most careful and intensive study. Angina pectoris is not the commonest type of dolor pectoris.

The most difficult feature of angina pectoris is its differential diagnosis from the discomfort caused by gastric or œsophageal spasm. The most important points of differentiation are that angina pectoris due to coronary disease is characteristically caused by effort at its inception and not by meals or excitement; that it is not burning but dull and heavy; and that it is in most cases attended by electrocardiographic changes.

The second criterion, coronary thrombosis, is less likely to be missed than is angina pectoris of a paroxysmal nature. At present the danger lies in over-diagnosis. Several conditions wrongly called coronary thrombosis are acute indigestion or intestinal intoxication. Pulmonary embolism is often mistakenly called coronary thrombosis. The rare dissecting aneurysm is easily confused. Paroxysms of tachycardia may be wrongly interpreted.

The third criterion is electrocardiographic evidence, which is as good as the other two criteria. Bundle-branch block appearing under observation in middle or old age or in the third or fourth decades means coronary disease; characteristic coronary T waves similarly, in the absence of active diphtheritic or rheumatic infection or of digitalis intoxication, mean coronary disease. The coronary disease revealed by the electrocardiogram may not be immediately serious or fatal, but it is always important and demands at least a very careful analysis.

In the last fifteen years the author has had 1,518 patients with unquestioned coronary disease. Males outnumbered females, 1,192 to 326. Angina pectoris occurred in 1,097, coronary thrombosis in 542; 251 patients had both angina pectoris and coronary thrombosis. The remaining 130 of the 1,518 cases (9 per cent) showed clear evidence in their electrocardiograms without history of either angina pectoris or coronary thrombosis.

No other evidence means coronary disease. Cardiac enlargement, hypertension, arrhythmias (including premature beats, paroxysmal tachycardia, and auricular fibrillation, but excluding heart block), dyspnœa, congestive failure of either ventricle or both, and even sudden death, although often found with coronary disease, do not prove its presence. Many cases, however, are carelessly so labeled, especially those of older patients with auricular fibrillation.

LILLIAN A. CHASE

Disturbances of Rate and Rhythm in Acute Coronary Artery Thrombosis. Master, A. M., Dack, S. and Jaffe, H. L., *Ann. Int. Med.*, 1937, **11**: 735.

Conclusions are drawn from a study of 300 cases of coronary artery thrombosis. All types of irregularities were present. Premature beats were found in one-quarter of the patients. Other arrhythmias occurred 46 times in 42 patients. Of these, auricular fibrillation comprised one-half. Arrhythmias usually appeared during the first three days following an occlusion, and with the exception of nodal rhythm and heart block, which may last one or two weeks, were transitory. The mortality rate of the patients with arrhythmias, excluding those with premature beats only, was almost double that of the patients with regular sinus rhythm. Half the deaths occurred after cessation of the arrhythmia, and only rarely was the arrhythmia itself the cause of death. The cardiac rate was a very significant factor in the outcome of an attack. If the ventricular rate was over 120 or under 40 beats per minute, whether the rhythm was regular or irregular, the outlook was poor; when a rate of between 60 and 100 was maintained the patient almost always recovered.

An arrhythmia may be the first and only sign of coronary artery thrombosis. The sudden onset of an arrhythmia should suggest the diagnosis of coronary occlusion. The site of infarction does not determine the type of cardiac irregularity, except that thrombosis of the right coronary artery with posterior wall infarction was usually found in the fatal cases with heart block.

Specific treatment of the arrhythmias is unnecessary. Digitalis and quinidine are considered dangerous in the treatment of coronary artery thrombosis as they may actually initiate arrhythmias. Only when a persisting irregularity produces severe shock or increasing heart failure should they be given. At the onset morphine may be given liberally.

H. GODFREY BIRD

Clinic on Coronary Thrombosis: Clinical Features Frequently Misinterpreted. Willius, F. A., *Proc. Staff, Mayo Clinic*, 1937, **12**: 718.

It is important to appreciate fully the less common manifestations of coronary thrombosis so that prompt recognition will permit the institution of complete rest. A case in a man 42 is described. He had attacks of retrosternal pain, increasing in frequency. Physical examination was normal. The heart was not enlarged. The electrocardiogram in the conventional leads did not give any evidence of abnormalities, but lead IV, made according to the method of Wolferth, revealed a positive (upright) T-wave which is normally negative (inverted). A diagnosis of recent coronary thrombosis with acute cardiac infarction and recurrent anginal seizures was made and six weeks' complete bed rest was prescribed.

When the incidence of a disease is increasing its subjective and objective manifestations are likely to be atypical.

LILLIAN A. CHASE

The Sedimentation Rate in Angina Pectoris and Coronary Thrombosis. Riseman, J. E. F. and Brown, M. G., *Am. J. M. Sc.*, 1937, **194**: 392.

The authors have found the corrected sedimentation index a valuable aid in distinguishing between angina pectoris and coronary thrombosis. A moderate elevation of the corrected sedimentation index (0.73 to 1.38) may occur in about half the patients with angina pectoris, suggesting myocardial damage. However, in the clinical syndrome of coronary thrombosis sedimentation indices of much higher magnitude are encountered. The fastest rates are observed between the fourth and twelfth days after the onset of symptoms. The sedimentation rate was found to reflect the progress of the patient, but was of little aid in prognosis of the acute attack. The mortality of patients discharged from the hospital with fast sedimentation rates was twice as great during the first year as that of patients who had normal or low rates. The authors

suggest that patients convalescing from coronary thrombosis be confined to bed until their corrected sedimentation index is normal or shows no further progress towards normal.

E. S. MILLS

Surgery

Gastric Surgery and Gastroscopy. Schindler, R. and Giere, N., *Arch. Surg.*, 1937, **35**: 712.

Among the questions which the authors discuss are:

1. Is a lesion of the stomach which has been diagnosed by other methods a benign ulcer or a carcinoma?
2. Is cancer of the stomach operable or not?
3. Of what value is gastroscopy in the early diagnosis of carcinoma, and may it improve the operative results?
4. What are the reasons for the abdominal distress which so frequently follows operations for gastric lesions? They endeavour to show the value and usefulness of gastroscopy to the surgeon.

Four hundred and sixty-five gastroscopies were performed; 41 of the patients on whom gastroscopy was performed also received surgical treatment. The latter group furnished the material for this paper. Biopsic control was possible in twenty cases. Twenty-eight gastroscopic examinations were carried out on the 41 patients. It must be admitted that negative findings in gastroscopy are not entirely conclusive, though the diagnosis was confirmed in every instance in which the authors had biopsic control. The differential diagnosis between benign and malignant ulceration is not difficult to determine after a gastroscopic examination by one trained in the field, even in the very early stage biopsy is not necessary. The differentiation between benign and malignant obstruction is more difficult but also possible. Gastroscopic diagnosis was proved to be correct in each of 7 patients. The operability of carcinoma was best determined by gastroscopy. Early gastroscopy together with an early roentgenogram is able to reveal operable carcinoma. Gastroscopy was proved to be superior to roentgen examination in certain cases. Gastroscopy and roentgenography supplement each other. Early diagnosis of gastric carcinoma can be brought about if each patient over 35 years of age who suffers from anorexia or significant loss of weight, and in whom no other explanation for the symptoms is found, is immediately examined gastroscopically and roentgenographically.

G. E. LEARMONTH

Subtotal Gastric Resection for Peptic Ulcer. Miller, G., *Surg., Gyn. & Obst.*, 1937, **65**: 489.

The indications for resection are the removal of the acid-secreting portion of the stomach and the more rapid emptying time, with some regurgitation of the alkaline duodenal contents. The author contends that the results obtained from this operation in persistent recurrent ulcers after repeated operations warrants its use in all cases if the mortality can be kept below 5 per cent. It is a physiologically sound operation. The causes of failure to relieve all gastro-intestinal symptoms are due to small stomach symptoms, poor functioning of the stoma, recurrence of the ulcer, and the occurrence of marginal ulcer and gastrocolic or jejunocolic fistula. If the author cannot use local anæsthesia he prefers high nupercainal spinal anæsthesia, with, later, a splanchnic nerve block. He favours the Finsterer method basically, and gives the exact technique for the various problems encountered. Water is given after 24 hours with gradual increase to full diet by discharge on the twelfth or fourteenth day. Carbon dioxide rebreathing is given for a few minutes several times daily for three or four days. Recurrent or marginal ulcers are signs of incomplete operation. Anæmia is probably due to incomplete absorption of or inadequacy of food.

FRANK DORRANCE

Lipiodol Visualization of the Bile Tracts in Lesions with Jaundice. Baker, H. L. and Bacon, C. M., *Surg., Gyn. & Obst.*, 1937, **65**: 220.

The authors have used lipiodol in preference to diodrast inasmuch as it is more viscid. The lipiodol was injected at 99 to 100° F. in quantities of 10 to 20 c.c. through the drainage tube following a cholecystotomy or through the T-tube in the common bile duct. Injection with immediate radiography during operation may be done to eliminate the possibility of common duct stone, or post-operatively to define the amount of resolution of an acute or chronic pancreatitis, or 10 to 15 days after operation, to differentiate between the induration due to chronic pancreatitis or carcinoma of the head of the pancreas when such is not possible at the time of operation.

FRANK DORRANCE

Obstetrics and Gynæcology

Maternal Morbidity. Grier, R. M., *Am. J. Obst. & Gyn.*, 1937, **34**: 28.

The conclusions reached are based on a study of 4,837 deliveries in Evanston Hospital from 1930 to 1935. The standard used was that of the American College of Surgeons. Low-forceps delivery occurred in 40.7 per cent of the cases, but the morbidity rate, 5.2 per cent, differed but little from that of spontaneous delivery, 3.8 per cent. There was little difference in the morbidity rate whether rupture of the membranes occurred spontaneously or artificially. Medical induction did not increase morbidity.

Uterine packing carried a high rate of morbidity, but it should not be delayed too long as the hæmorrhage is equally dangerous. Excellent work may be done in a general hospital where the majority of the work is done by a well-controlled group of trained obstetricians.

Morbidity can be reduced by keeping to a minimum the more radical types of delivery such as mid- and high-forceps, version and extraction, and Cæsarean section, by lessening through conservative obstetrics the number of cervical tears, by maintaining a good delivery room technique, avoiding changes in the nursing staff, and by keeping an analysis of work done for which good records are essential.

ROSS MITCHELL

Puerperal Infections in Relation to Midwifery Attendants. Wood, J. L. M., *Brit. M. J.*, 1937, **2**: 811.

Not only for the benefit of the patient but also in the interest of the attendants all cases of pyrexia during the puerperium should be investigated as a routine. If in the course of this investigation one of the attendants is found to harbour the *S. pyogenes* in his or her throat or air-passages then work in midwifery should be suspended until the attendant is bacteriologically negative, whether shown to have been the actual cause of the infection or not; this would also apply to streptococcal infections in the midwifery practitioner. Although such rules appear very stringent at first sight the prospect of obtaining the swab-negative state is not so gloomy as might be imagined. The swabbing of clinically normal throats, unless they are believed to be a source of infection, cannot be too much deprecated.

ROSS MITCHELL

The Treatment of Varicose Veins in Pregnancy. Solomon, E., *J. Obst. & Gyn. Brit. Emp.*, 1937, **44**: 650.

Sixty pregnant women suffering from varicose veins were treated with the injection of quinine urethane. Satisfactory results were obtained in 97 per cent. Although slight inflammatory reactions occurred in some cases the relief obtained more than compensated for the previous discomfort. No serious complication resulted. The puerperia so far as could be ascertained were uncomplicated. Of 3 patients who had subsequent pregnancies only 1 had a slight recurrence of varicose veins. The injection of quinine urethane in 2 c.c. doses does not affect the pregnant uterus.

ROSS MITCHELL

Pædiatrics

Ileocæcal Lymphadenitis in Children. Brown, A. E., *Surg., Gyn. & Obst.*, 1937, **65**: 798.

The author reports 30 proved cases in children between 2 and 16 years. He recognizes acute and subacute cases. He has been able to make a pre-operative diagnosis by the colicky nature of the pain with its sudden onset and as sudden disappearance, the tenderness localized more to the median line than McBurney's point, and, in the acute cases, the marked toxicity. All of these 30 cases have been under observation over 13 years; some have been under observation as long as 7 years before operation. In none of them has macroscopic inflammation of the vermiform appendix been present; yet in all of them appendicectomy has caused disappearance of the pain. He has not found tuberculous infection in any; x-rays taken several years after in 8 have not revealed calcification. The most surprising factor is that the lymph nodes in the mesentery of the appendix have not been involved, despite the ileocæcal involvement in 25 of them, cæcal in 5, right common iliac in 3, root of the mesentery in 6, mesentery of the lower ileum in 7, and median common iliac in 1.

FRANK DORRANCE

Therapeutics

The Treatment of Myasthenia Gravis. Thorner, M. W. and Yaskin, J. C., *Am. J. M. Sc.*, 1937, **194**: 411.

Thorner and Yaskin have studied the therapeutic effect of various drugs in the treatment of 6 cases of myasthenia gravis. Aminoacetic acid, potassium chloride, and roentgenotherapy were found to produce no beneficial results. Ephedrine and benzedrine were found advantageous in 3 cases, particularly when combined with prostigmin. Prostigmin proved valuable in the treatment of all 6 cases of myasthenia gravis; three of the 6 patients were able to return to work. The dosage of benzedrine recommended is three 10 mg. tablets daily combined with five to seven 15 mg. tablets of prostigmin. In many cases prostigmin alone is effective in the dosage already indicated. All 6 patients showed a gain of weight, varying from 5 to 25 pounds. Occasional diarrhœas were controlled easily with tablets of atropine, gr. 1/150, taken orally when necessary. The disadvantages of prostigmin therapy are two—the expense of the drug and its tendency to produce diarrhœa and sweating when given in large quantities.

E. S. MILLS

Chronic Arsenical Poisoning During the Treatment of Chronic Myeloid Leukæmia. Kondel, E. V. and LeRoy, G. V., *Arch. Int. Med.*, 1937, **60**: 846.

X-ray treatment banished the use of arsenical preparations in this disease until 1931, when successful treatment by potassium arsenite was again reported. This therapy is used along with x-ray, which seems to have some effect in lowering the white cell count when applied to the enlarged lymph nodes. In several cases reported the disease was controlled by arsenical treatment

alone, *i.e.*, five minims of potassium arsenite solution three times a day or, beginning with this dose, increasing by one minim a day until 9 drops t.i.d. are given and then stopping for 3 weeks. One disadvantage of the second method was that the white cell count got out of control in the resting stage. X-ray treatment apparently is able to "rescue" the cases where this has happened. As might be expected, some patients could not tolerate the arsenic, as shown by gastro-intestinal upset. There is a great variation in susceptibility; also the preparation of arsenic used is very important. Complications during treatment include cirrhosis, insidious in onset, affections of the nervous system, often heralded by an attack of herpes zoster and perhaps going on to extensive paralysis, and skin lesions, keratosis, and in syphilitic treatment exfoliating dermatitis. Excretion is mostly by the kidney while the organs in which the greatest amount of the substance is found are the brain, with the liver next in order.

P. M. MACDONNELL

Pathology and Experimental Medicine

Acute Myeloid Leukæmia in One of Identical Twins. Kellett, C. E., *Arch. Dis. Child.*, 1937, **12**: 239.

The place which identical twins occupy in the realm of scientific medicine in furnishing a control for theories advanced as to the etiology of disease is well recognized. Here is reported a case of acute myeloid leukæmia in one of twin sisters, whose points of resemblance (hair and eye colour, direction of hair-whorl on the head, finger prints, measurements, refractive errors in eyes, blood group) would indicate that they were uniovular. One developed the disease in January, 1937. She had attacks of prolonged bleeding from the nose, was anæmic, had a normal-sized spleen, and showed no enlargement of the lymph glands. Her white blood count was only 7,500 on admission, with over 90 per cent of the cells of the primordial type. Six weeks later the count had risen to 133,000, with 98 per cent of the cells in this category, and the spleen had become enormous. She died about 6 weeks later after the diagnosis of myeloid leukæmia was made.

The twin sister remained perfectly well throughout this period, with a blood count in April, 1937, of 5,600 white blood cells; of which 60 per cent were polymorphonuclears. Because of the disease being absent from the second twin, the author argues that a purely hereditary factor cannot be at the basis of myeloid leukæmia, but that some external factor present in one twin and not the other must have precipitated the disease. The idea that this may be some non-specific infective process to which the patient with leukæmia reacts in an unusual manner is discussed, also the idea that some specific factor of low infectivity is responsible for the disease. Analysis of the cases of leukæmia that have been encountered in the district for the last five years is thought to lend support to this latter view.

(Abstracter's note.—To assume that myeloid leukæmia is not hereditary because one twin has failed to show the disease within three months of the onset in the other twin, is to overlook entirely the possibility that the second twin may develop the disease within a year or two year's time. A differential action of external factors on identical hereditary backgrounds may account for the different response of the twins; on the other hand no such external factor need be invoked until it is definitely proved that the second twin will not have leukæmia.)

MADGE THURLOW MACKLIN

A Dysgerminoma Removed During Pregnancy. Stabler, F., *J. Obst. & Gyn. Brit. Emp.*, 1937, **44**: 705.

Dysgerminoma of the ovary has been recently recognized as an individual growth in the ovary.

Cells representing both male and female mesenchymal cords of embryonic ovary tissue are seen. Some areas show cords of tubules growing down to meet the seminiferous tubules. In other areas granulosa cells with collections of lymphocytes and areas of degeneration are seen. These indifferent granulosa cells may be carried into adult life by subjects of imperfect gonadal development, such as cryptorchids. Hermaphrodites present dysgerminoma more frequently than normal individuals. R. Meyer found that out of 48 cases, 27 were found in pseudohermaphrodites and 21 in normal women. This growth may effect one gonad or both. The tumour tends to occur at an early age, usually in the second or third decade. The author only knows of one other case occurring with pregnancy. The tumour removed was firm, solid, smooth, light fawn in colour, with some yellow areas of necrosis. Microscopically, the cells are large, round, with hyperchromatic nuclei, with a small amount of clear-staining cytoplasm arranged in parallel columns and masses separated by narrow strands of connective tissue. The capsule is not invaded.

P. J. KEARNS

The Urinary Excretion of Androgenic and Œstrogenic Substances in Certain Endocrine States. Studies in Hypogonadism, Gynæcomastia and Virilism. Kenyon, A. T., Gallagher, T. F., Peterson, D. H., Dorfman, R. I. and Koch, F. C., *J. Clin. Investigation*, 1937, **16**: 705.

The comparison of the excretion of male and female hormone-like substances with the clinical expressions of disease may be expected to teach us the extent to which studies of the urine reveal the changing functions of the gonads, and may help to illuminate the difficult

pathological physiology of such obscure processes as virilism and gynæcomastia. The authors studied conditions of hypogonadism in the male—castration, eunuchoidism, and cryptorchidism; precocious puberty and gynæcomastia; and virilism in the female. Two castrated men excreted traces only of androgenic and œstrogenic substances. Seven eunuchoids excreted on the average a third of the normal amount of androgens, overlapping the normal range on occasion; the output of œstrogens was also low. In four cases of gynæcomastia no excess of œstrogenic material was excreted; the androgens varied from none to a normal amount. Sixteen patients with virilism excreted as a rule normal amounts of androgenic material. A moderate excess of androgens is occasionally found and the great excess of 480 international units per day was found in one case of carcinoma of the adrenal cortex. The authors have had no case of virilism in which there was increased excretion of œstrogens.

A. G. NICHOLLS

Anæsthesia

Episubdural Anæsthesia. Soresi, A. L., *Current Res. in Anæsth. & Anal.*, 1937, **16**: 306.

A new technique combining the advantages of subarachnoid block and epidural block is described by the author, who has employed it successfully in over 200 cases. The disadvantages common to either method used singly are minimized and the advantages enhanced by the use of the combined method. It results in a lengthening of the period of surgical relaxation and anæsthesia and gives a sustained relief from pain for a period of 24 to 48 hours during the post-operative period.

The rationale behind the method is that, as subarachnoid anæsthesia is beginning to wane, that resulting from the epidural block is beginning to intensify and the period of anæsthesia is prolonged. The technique is fairly simple and is done at the one injection. The patient is given an injection of 7½ gr. of caffein about 20 minutes before the operation. After anæsthetizing the site of puncture with novocain solution, 1:200, a fine spinal needle is pushed in until a hanging drop, previously attached to the hub of the needle, is drawn inwards as the point enters the epidural space with its attendant negative pressure. An ampoule of caffein (7½ gr.) is drawn into a 10 c.c. syringe and 200 mg. of novocain crystals are added to the syringe, together with enough sterile distilled water to make 7 to 8 c.c. of solution. The entire mixture is injected slowly into the epidural space while the spiral needle is held firmly in the correct position.

When all has been injected the 10 c.c. syringe is detached, and the needle advanced until it enters the subarachnoid space when spinal fluid will drip freely from the end. According to the size of the patient 100, 120 or 150 mg. of novocain crystals are dissolved in about 2 c.c. of spinal fluid and injected as in ordinary subarachnoid block. The patient is then placed on his back on the operating table and hypodermoclysis is started with two needles inserted into the thighs. About 1,000 to 2,000 c.c. of normal saline are given in this way during the operation and immediately afterward.

The author deprecates the use of sedatives either before or during the anæsthesia, and is convinced that the patient's fear or restlessness can be controlled by the attentions of the anæsthetist. He places great confidence in the effect played by the administration of caffein before and during the anæsthesia, and considers that it prevents and counteracts the depressing influence of the novocain. The reason for the small volume of the epidural injection (about 8 c.c.) is that normally the pressure in this space is negative and large volumes will alter this, making it positive, and thus upset the normal physiological activity. He attributes the troubles noticed in ordinary epidural anæsthesia to this increase in pressure.

The anæsthetic effect by this method is prolonged for 24 to 48 hours. This does not mean that surgical anæsthesia lasts that long but that sufficient anæsthesia remains to prevent the feeling of post-operative pain. Convalescence and final recovery are hastened and the terror of post-operative pain is abolished.

F. ARTHUR H. WILKINSON

Hygiene and Public Health

Zinc Sulphate Nasal Spray in the Prophylaxis of Poliomyelitis. Tisdall, F. F., Brown, A., Defries, R. D., Ross, M. A. and Sellers, A. H., *Canad. Pub. Health Jour.*, 1937, **28**: 523.

The claim that nasal spraying with certain chemicals will act as a prophylactic in poliomyelitis has evoked widespread interest. The recent epidemic of poliomyelitis in Ontario gave an opportunity to try out the method. A solution of 1 per cent zinc sulphate, 1 per cent pontocaine, and 0.5 per cent sodium chloride was used. The public was advised by paid advertisements in the newspapers that children between the ages of 3 and 10 might receive this treatment at certain designated centres in the city of Toronto. Only trained oto-laryngologists were used and the technique employed was that recommended by Peet, Echols and Richter.

5,223 children were sprayed between August 31st and September 5th; of these 4,585 returned for a second treatment between October 10th and October 15th. Added to this number were some cases treated privately by the same oto-laryngologists, making a total of 4,713 children resident in Toronto who were treated twice. It

is impossible to determine satisfactorily whether the spray was properly applied in all cases (a number of children did not lose their sense of smell), but since the application in all cases was made by specially trained men it is unlikely that a better application could be secured on a large scale.

Among the 4,713 children sprayed 11 cases of poliomyelitis occurred within 30 days following the second spraying. Within the same period of time 18 cases occurred among 6,300 control children. The difference is not statistically significant. The study, therefore, furnishes no evidence of the protective value of the procedure. The difficulties in the way of applying this method on a very large scale make it doubtful whether it will become a practical public health procedure.

FRANK G. PEDLEY

Exposure to Trichlorethylene. *Industrial Bull., New York State Dept. of Labor,* November, 1937, p. 16.

Trichlorethylene, $CHCl = CCl_2$, is used quite extensively in industry as a degreasing agent. The following trade names are listed: Benzinol, Blacosolv, Cecolene, Chlorylen, Circosolv, Flack-Flip, Lanadin, Lithurin, Perm-A-Chlor, Petzinol, Trial, Triclene, Trialin and Vestrol.

No fatal cases have been reported in the American literature, but elsewhere 284 cases of poisoning have been collected by Stüber of which 26 were fatal. The symptoms which are to be looked for are chiefly gastro-intestinal (nausea, vomiting and colic) and central nervous (headache, dizziness, unconsciousness).

Three cases are reported of possible trichlorethylene poisoning. Liver damage is to be feared.

FRANK G. PEDLEY

Obituaries

Dr. Thomas Armstrong, of Halifax, N.S., died at his home on December 17, 1937, shortly after his return from England, where he was undergoing treatment. Dr. Armstrong was born in Glasgow, Scotland in 1869, and was a graduate of Glasgow University (1895). Up to the time of his illness he had been following the sea as ship's doctor on a cable boat. Surviving him are his widow, and one brother, Dr. Robert Armstrong.

Dr. Joseph S. Brooks, of Weston, Ont., died on December 8, 1937, in his seventy-third year. He was a native of Bond Head, Ont., and had practised in Little Current, Sask., and Tottenham before coming to Weston seven years ago.

Dr. Tancrede Charles Gaboury, of Montreal, former collector of provincial revenue for the district of Montreal and ex-member of the Legislature for Pontiac, died on December 28, 1937.

Dr. Gaboury was born at St. Jean Baptiste de Rouville, on March 13, 1851, the son of Jean Baptiste Gaboury and Rosalie Malo. Following his classical studies at St. Hyacinthe College he studied at Ottawa University and the Montreal College of Medicine. He was the first French-Canadian doctor to open an office in Pontiac county, where he practised his profession for nearly 50 years.

Dr. Gaboury was mayor of Bryson for five years. He ran as a Liberal in the federal election of 1896 but was defeated by W. W. J. Poupore. He was elected to the Quebec Legislature in 1908. He married Mary Jane Fletcher, of Rigaud, who predeceased him in 1936.

Dr. Raymond Ignatius Gillis died recently at Baddeck, N.S., after a year's illness. Born in Tracadie, N.S., in 1896, the son of Mr. and Mrs. M. K. Gillis, of Sydney Mines, Dr. Gillis was a graduate of St. Francis Xavier and took his medical degree at Dalhousie University (1922). He had been practising in Baddeck for the past fifteen years. He is survived by his widow; his father and mother, Mr. and Mrs. M. K. Gillis, of Sydney Mines; by his daughter, Frances; and by four brothers and a sister. Active in the life of the community, he was a member of the Baddeck Board of Trade, the Bras d'Or Yacht Club, and the Cape Breton Medical Society.

Dr. Duncan Gow, aged 77, former Calgary medical health officer, died at his home on January 12, 1938. He was a resident of Calgary since 1904.

From 1923 to 1933, Dr. Gow was city health officer, retiring four years ago to devote himself to private practice.

Born at Wallacetown, Ont., Dr. Gow graduated in medicine from Trinity University, Toronto (1883), when 21 years old. After post-graduate work in London and Edinburgh Universities, he returned to Canada to practise his profession at Cardinal, Ont.

Dr. Charles James Hamilton, of Cornwall, Ont., died on December 19, 1937. He had practised in Cornwall for fifty-eight years.

Dr. Hamilton was born in Goderich, Ont., on September 15, 1855, a son of Dr. Morgan James Hamilton, one of the early settlers in Huron County. He received his early education in the common schools at Goderich, graduated from the Grammar School, and for three years studied as a druggist. In 1875 he entered University of Toronto as a student in medicine, and graduated M.B. in 1879. For a short time he remained with his stepfather, Dr. G. C. Shannon, of Goderich, and then withdrew in favour of his half-brother, the late Dr. John R. Shannon. He came to Cornwall and entered partnership with Dr. J. J. Dickinson on November 27, 1879, and remained with Dr. Dickinson until the latter's death in 1884, when Dr. Hamilton opened an office in his own name, which he continued until recently.

Dr. Hamilton served Cornwall as Councillor, Reeve. Deputy Reeve and Mayor, being in the Chief Magistrate's seat in 1889 and again in 1894. For many years he was a member of the Board of Public School Trustees. He was still a member for the 1937-38 term. He was Conservative member of Parliament for Stormont from October, 1925 to July, 1926. He had been Coroner for this district for almost fifty years and for fifty-two years was divisional surgeon for the former Grand Trunk Railway and present Canadian National Railways, for the territory from Aultsville, Ont., to Coteau, Que.

Dr. Hamilton was twice married, first to Harriet Sara Dickinson, eldest daughter of Dr. J. J. Dickinson. Of that union five sons were born, Charles Reginald, Clarence Dickinson, Ernest Patrick, George Carroll Shannon, Maurice Cayley all of whom are deceased except Charles Reginald, who is at home. C. D. Hamilton and M. C. Hamilton both became doctors,

the former giving up his life after four years' service in the Great War. Their mother died June 20, 1897.

Dr. Hamilton's second wife was Helen Cline, a daughter of Samuel Cline, a pioneer Cornwall merchant. She died May 15, 1937.

Dr. Jean Jacques Lamontagne, of Montreal, died on December 23, 1937, in his twenty-ninth year. He was the son of Dr. Aimé Lamontagne, born in Montreal, and a graduate of the University of Montreal (M.D., 1932). He had been on the staff of St. Luke's Hospital, Montreal, for the past five years.

Dr. Albert Laramee, of Montreal, librarian at the Faculty of Medicine, University of Montreal, died about November 21, 1937. He was a graduate of the University of Montreal (M.D., 1897).

Dr. A. E. McRitchie died recently in Union Hospital at Indian Head from staphylococcus septicæmia.

Dr. McRitchie was born in Kent county, Ont., 48 years ago. In 1912 the family moved to Zealandia, Sask. Dr. McRitchie attended Western University, London, Ont., where he graduated in medicine in 1911, and then took a post-graduate course in eye, ear, nose and throat in Los Angeles, returning to Saskatchewan later to open a practice. About ten years ago he established himself at Qu'Appelle and developed an extensive practice, being also M.O.H. for the town of Qu'Appelle and the rural municipality of South Qu'Appelle. He had taken a prominent part in the public welfare work at Qu'Appelle during the past years, was a member of the high school board, member of the A.F. and A.M., I.O.O.F. and the United church.

Dr. McRitchie is survived by his widow; two sons, Donald, taking his first year medicine at Winnipeg, and Bobbie at home; his mother; four brothers and one sister at Zealandia.

Dr. Charles Olivier Milot, of Montreal, died during the last week of November, 1937. He was born in 1892 and a graduate of the University of Montreal (M.D., 1922).

Dr. William Ernest Nelson, of Montreal, died on January 13, 1938, in his fifty-eighth year. Born in Montreal, a son of the late William John Nelson and Mary Jane Irvine, Dr. Nelson was educated at Montreal High School and McGill University, graduating M.D., C.M. in 1903.

At the outbreak of the Great War he was medical officer of the Grenadier Guards. Later he served overseas with No. 2 Canadian General Hospital. He was invalided home in 1917 and resumed his practice in the city.

Dr. Nelson was twice married, his first wife dying while he was overseas. He is survived by his second wife, the former Edith Alice Jamieson; one son, William John Nelson; and one daughter, Miss Marjorie Nelson.

Dr. Edwin Kendall Richardson, of Toronto, homœopathic physician, died on January 4, 1938. Born at Flesherton, he was the only son of the late Matthew K. Richardson, M.P. He was a graduate of the University of Toronto (1895), physician for the I.O.O.F., and a Major of the 9th Battery, C.F.A. He was well known in professional, military and musical affairs.

Dr. Edouard Rose, of Montreal, died on December 9, 1937. He was born at Ste. Philomène, Que., in 1852, and began practice in Montreal in 1904. Dr. Rose was educated at Ste. Therèse Seminary and graduated in medicine from the Faculty of Medicine of Bishops University (1874). He first practised for two years in Chateaugay, N.Y., afterwards moving to St. Anicet, Huntingdon County. After practising medicine there for 28 years he came to Montreal and established himself in the district around St. Henri ward.

Dr. John Steele Smith, of Edmonton, Alta., passed away on January 2, 1938, from heart failure. He was a graduate of Glasgow University (1900). After taking his F.R.C.S. at Edinburgh, he decided to come to Canada, and settled in Saskatchewan, where he registered in 1916. In 1918 he decided to live in Alberta and registered there, practising first at Edgerton, then moving to Edmonton. He was senior officer in the Legion of Frontiersmen and past-president of the Edmonton Burns Club. As a medical practitioner he enjoyed the confidence of a large clientèle. He is survived by his widow, three daughters and one son.

Dr. Joseph Eugène Turcot, of St. Hyacinthe, Que., died on December 11, 1937, in his eighty-eighth year. He was born in St. Hyacinthe, the son of Dr. Magloire Turcot. He was a graduate of Laval University, Quebec (1875) and had been in practice in St. Hyacinthe for more than fifty years. He was one of the founders of St. Charles Hospital, St. Hyacinthe, and for a number of years was its chief surgeon. Dr. Turcot was a Knight of the Order of St. Gregory.

Dr. Henri Romeo Vallée, of Montreal, died on or about January 15, 1938. He was born in 1895, the son of the late Napoleon Vallée, and was educated at the College of Montreal and the University of Montreal (M.D., 1918). He was on the staff of the Lachine General Hospital, St. Joseph's Hospital, Lachine, and the Ste. Jeanne D'Arc Hospital, Montreal.

Dr. Douglas Wallace died in the Winnipeg General Hospital on December 23, 1937, aged 53. Born in Fifeshire, Scotland, he came to Winnipeg as a boy with his parents, and received his medical education in the Manitoba Medical College, graduating M.D. in 1913. He practised at Swan Lake, Man., until the Great War, when he went overseas as M.O. with the 181st Battalion C.E.F. On returning to Winnipeg he established a practice in East Kildonan and for a time was health officer of that municipality. He was also a former chairman of East Kildonan School Board and president of the Home and School Association. He served for three years as medical officer of the Canadian Pension Board and in that capacity travelled widely through the west. He is survived by his widow and three daughters. Dr. Maxwell Wallace, of Emerson, Man., is a brother.

News Items

Great Britain

A question asked in the British House of Commons reveals that the Canadian investigations on the subject of the possible prevention of silicosis by the admixture of aluminum with silica dust are being followed with interest by the special committee advising the Medical Research Council on this subject, and already some experiments along similar lines have been initiated in England.

Alberta

A Provincial Society for the Control of Cancer is being organized in Alberta. The Chairman of the Cancer Committee of the Provincial Medical Association, Dr. M. R. Bow, Deputy Minister of Health, resigned owing to pressure of departmental work, and Dr. W. H. McGuffin, of Calgary, was unanimously elected by the Board of Directors to fill his place. It

is expected that there will be nine District Associations, and six or eight local societies. The first steps being taken are to appoint a provisional provincial executive committee to get the work under way. An announcement in this regard will be made shortly.

The town of Lacombe has just opened a new hospital of twenty-bed capacity, which will serve a rural district as well as the town. An additional doctor has been added to the staff, making five in all now in the town.

Red Deer has honoured itself and the medical profession by electing at the head of the polls, Dr. C. R. Bunn, as Alderman for 1938. Dr. Bunn is President-elect of the Canadian Medical Association, Alberta Division.

Alberta registered fifty members last year, which is 50 per cent more than the average number for the previous ten years. A number of these are now in Great Britain taking post-graduate work. The average number of active practitioners in Alberta has not varied by fifteen in fifteen years.

For many years the College of Physicians and Surgeons has been making grants to the Alberta University Medical library, in the hope that the physicians outside the City of Edmonton would avail themselves of the free use of the books. It regrets that few avail themselves of this opportunity, apparently preferring to buy their books and get their journals direct.

There are vacancies for physicians in the following towns: Paradise Valley, Heinsberg, Delia, Craigmyle, Onoway, Waskatenau, Ferintosh and Forestburg. There are other places available, on the purchase of the present practitioner's residence. G. E. LEARMONTH

British Columbia

A new wing in the Enderby General Hospital was formally opened recently, which practically doubles its accommodation.

Two Vancouver nurses left on December 16, 1937, to open a six-bed hospital to be operated by the Canadian Red Cross at McBride, a town of 300, which is the centre of a large ranching and farming area, half way between Prince George and Jasper. A finely built home with stone foundations, cement floors, full plumbing, and large heating plant has been acquired for the hospital. Its owners were forced to leave McBride on account of the rigorous climate. The hospital was opened to patients on January 1, 1938.

Two other Vancouver nurses have left to open a new hospital for the Canadian Red Cross Society at Kyuquot. Kyuquot is a fishing village with a population of 150 situated on the wet and rocky west coast of Vancouver Island. It has a school with 15 pupils and a government radio-telephone station, and is served by a steamer from Victoria and Vancouver making three trips a month. The new hospital will have five beds, combination case-room and surgery, necessary domestic offices, and nurses' quarters.

Dr. H. E. Young, Provincial Health Officer, at a special meeting of the Vancouver Metropolitan Health Board has stated that a special act officially establishing the board will be introduced at the next session of the Legislature.

Dr. G. F. Amyot, who has held the position of advisor on hospital services and assistant to the Provincial Health Officer since January, 1936, has resigned to accept a position as assistant to Dr. Carl Buck, field director of the American Public Health Association. Dr. Amyot has been replaced by Dr. J. S. Cull, who has been for a short time director of one of the units of the Vancouver Metropolitan Health Board.

According to the press, it has been announced by the Hon. G. M. Weir, Provincial Secretary, that health certificates in connection with marriage may be considered by the government in the next session of the Legislature.

The death occurred recently in England of Dr. R. V. Dolbey, formerly a resident of Victoria and later of Vancouver. Dr. Dolbey, who came to British Columbia after serving in the South African War, was associated with the late Dr. O. M. Jones in Victoria before coming to Vancouver. He went to France with the Expeditionary Force, was for a time a prisoner of war in Germany, served also in the East African campaign in Tanganyika, and was twice mentioned in despatches. In 1919 he was appointed to the Chair of Surgery at Cairo School of Medicine, where he remained until a few years ago, when he returned to private practice in London.

An amendment to the Chiropody Act which would have given chiropodists the right to use the prefix "Dr." and follow the name with "chiropodist" was defeated on the second reading in the last session of the provincial Legislature.

Masseurs and physiotherapists in British Columbia will be licensed under the Naturopathic Physicians Act, according to a decision of the Legislature. The amendment of the Act was passed by a vote of nineteen to thirteen. The amendment was opposed under the leadership of Dr. J. J. Gillis, Liberal member for Yale, and Dr. F. P. Patterson, of Vancouver, leader of the opposition. All members of the government present at the time joined with all the Conservatives in opposing the amendment. D. E. H. CLEVELAND

Manitoba

The regular meeting of the Obstetrical and Gynæcological Section of the Winnipeg Medical Society was held in the Medical Arts Club Rooms on November 30th. Dr. F. G. McGuinness gave an address on "The new classification of the bony pelvis and its clinical significance". Dr. Digby Wheeler showed x-ray films illustrating the various types of pelves and also demonstrated a method by which the measurements of the bony pelvis and of the fetal head could be accurately estimated.

On January 12th Dr. J. McG. Lederman read a paper on "Pathological findings in eclampsia". Lantern slides of photomicrographs were shown.

Dr. Oliver S. Waugh was elected chairman of the Honorary Attending Staff of the Winnipeg General Hospital at the recent annual meeting of the staff.

ROSS MITCHELL

New Brunswick

Lieut.-Governor Murray MacLaren recently was host at a dinner to some forty-five members of No. 8 Bearer Company at Government House. This Company, which was later converted into a field ambulance, was the first medical unit recruited in New Brunswick. It was organized and recruited by Governor MacLaren, with headquarters in Saint John. Among those attending the dinner were several from out-of-town points.

Dr. H. A. Farris was re-elected President of the Saint John Anti-Tuberculosis Association.

Dr. B. W. Robertson, of Keswick Ridge, was elected as Warden of York County in January. Dr. Robertson has a record of many years' service to his municipality.

At the annual meeting of the New Brunswick Division of the Canadian Red Cross, Dr. L. DeV. Chipman, Saint John, was elected President. The Red Cross intends in 1938 to conduct a complete survey of physically handicapped children in the Province of New Brunswick.

Dr. Ronald W. Irving, a graduate of medicine of the University of Edinburgh of 1936, has established practice in the City of Moncton after a year of post-graduate study in England and Ireland.

Lieut.-Col. C. M. Pratt and Major A. S. Kirkland, R.C.A.M.C., were granted the efficiency decoration by Royal warrant, according to recent militia orders.

Dr. J. S. Hynes has been appointed full-time Radiologist at the Fredericton Victoria Public Hospital.

At the time of annual appointments to the staff of the Saint John General Hospital in December it was noted that arrangements have been made to subdivide the out-patient medical clinics, with a rearrangement of staff to provide for separate clinics in Dermatology, Hæmatology, Allergy, Cardiovascular Diseases and Diabetes. The hospital was recently the recipient of an anonymous gift to be used for the purchase of an orthodiascope which has recently been installed. This gift was made available through the good offices of Dr. H. A. Farris. A. S. KIRKLAND

Nova Scotia

In the highlands of northern Cape Breton are two thousand people without medical aid, cut off from the rest of Nova Scotia, their only highway, the famed Cabot trail, buried beneath great drifts of snow. Father Paul MacNeil, the parish priest, had sent out calls for assistance, while three persons lie seriously ill of what is thought to be pneumonia. Attempts to reach them by road have failed, but the flight of a doctor from Sydney by plane will probably bring relief to the present situation. The Provincial Department of Health is making efforts to have a practitioner settle there, but the rigors of the life and the poverty of the inhabitants make the practice unattractive for any one unless endowed with an ardent missionary spirit.

It was reported at the annual meeting at Pictou that the Sutherland Memorial Hospital showed a credit balance of more than $1,500 for the year 1937. The 306 patients admitted during the year represented an increase of 37 over the previous year, and, of the $12,000 in total receipts, $7,000 were from fees.

An eight-hour day for the nurses of the Aberdeen Hospital, New Glasgow, was the subject of a resolution recently passed by the local members of the United Mine Workers and steelworkers unions. The matter was considered by the executive of the board of trustees of the hospital and will probably be taken up at the annual meeting.

The Halifax press wallowed happily in a discussion between prominent medical men and the city Board of Health over the diphtheria situation. The appearance of a few cases recently brought from medical men the criticism that the Board of Health has apparently not been doing its part in advocating immunization. The Board replied sharply that three cases did not constitute an epidemic; that there was no immediate need for immunization; that there had been death in the southern United States from immunization (seven years ago, following administration of toxin-antitoxin). The day following this statement more than 150 children appeared at the immunization clinic of the Public Health Centre. Following a meeting with a committee from the Halifax Medical Society, the Board of Health made an official pronouncement in which it approved of and recommended diphtheria immunization. Regulations were set forth whereby it is to be carried out only at the request of the child's parent or guardian: there is to be no compulsion. Those who can afford to must pay for the procedure. The toxoid of the Connaught Laboratories is to be used. Following this publicity it is to be hoped that Halifax will move up with the rest of the province in the percentage of its children protected against diphtheria.

Captain F. B. Day, M.D., of Thorburn, was elected president of Branch 34, Canadian Legion, B.E.S.L., at the annual meeting at New Glasgow.

The ranks of the registered nurses in Nova Scotia were swelled by forty-five recently, with the announcement of results in the annual provincial registration examinations.

Dr. G. W. T. Farish was elected director and representative of the medical staff at the annual meeting of the Board of the Yarmouth Hospital.

Sir James Barrie, His Life and Works, was the topic on which Dr. D. H. Chisholm addressed the Pictou county branch of the Registered Nurses' Association.

Small-pox reared its head in the upper Stewiacke district, where several cases developed in the Cross Roads school. The school, which has an enrolment of 25, was immediately closed by the county board of health. Measures are being taken to prevent the spread of the disease and vaccine is in demand. It was found that a very small percentage of the children in the district had been vaccinated.

Reports of the school nurses to the Halifax Board of School Commissioners for the 1937 term showed that, out of 7,810 pupils weighed and questioned, 1,920 were found to have physical defects.

ARTHUR L. MURPHY

Ontario

At an examination held at Toronto, October 7, 1937, the undermentioned officers qualified for the rank of Lieutenant-Colonel, R.C.A.M.C. (N.P.): Majors W. W. Barraclough, J. D. H. W. Barnett, G. R. D. Farmer, N. F. W. Graham, M. G. Brown, M.C., A. T. Eaton, A. E. MacDonald, J. P. Fawcett.

A $100,000 building project is being undertaken next year in connection with the General Hospital at Chatham. The present hospital is now taxed beyond its capacity.

The city of London, as a result of the action of the ratepayers at their recent municipal election, will shortly start on a $400,000 addition to the Victoria Hospital.

Dr. Arthur Powers, formerly of Rockland, Ont., for two years resident physician at the Royal Ottawa Sanatorium, and more recently with the Ontario Travelling Chest Clinic, has been appointed in charge

of the new Hull Sanatorium for Tuberculosis, which has just recently been opened.

Dr. D. W. Smith, late M.P. for Dufferin-Simcoe, has been appointed to the Department of Health in the Division of Mental Diseases. Dr. Smith is at present attached to the Ontario Hospital at Whitby, where he is serving as Assistant Superintendent.

The Sisters of St. John the Divine, who were pioneers in medical nursing in Canada and are now carrying on a hospital in the diocese of Toronto, are considering the establishment of a hospital in Western Ontario. Bishop Seager, of the Synod of Huron, has been requested to appoint a committee to investigate the possibilities of this project.

In the recent report of the Medical Officer of Health for Toronto to his Board it was stated that the epidemic of poliomyelitis during the summer and autumn months of 1937 is definitely ended. The records show 748 resident cases with only 30 fatal terminations. The epidemic left in its wake 226 known persons (183 in homes and 43 in hospitals) requiring some form of after-treatment or follow-up care. This includes all cases, from those with slightly weakened muscles to those with extensive paralysis. Two specially qualified physiotherapists have been engaged for district work, to instruct those taking care of the patients with regard to proper procedure in the way of massage.

The new convalescent wing of the Hastings Memorial Hospital (municipal hospital) opened on December 3rd, with 26 admissions of all ages, subsequently increased to 33 admissions.

At a recent meeting of the London Academy of Medicine addresses were given by Prof. William Boyd, of the Department of Pathology, University of Toronto, on the subject, "Diffuse glomerulo-nephritis", and by Dr. Kenneth McKenzie, of Toronto, on "Trauma of the brain and skull".

The Hippocratic Society of the University of Western Ontario, held its annual banquet on December 10th, with Dr. Gordon C. Heyd, of New York, Past President of the American Medical Association, as guest speaker. J. H. ELLIOTT

Quebec

Dr. Edward W. Archibald, formerly Head of the Department of Surgery at McGill University and the Royal Victoria Hospital, Montreal, was signally honoured on January 11th, when he was formally presented with the honorary degree of Doctor of Medicine of the University of Paris. This degree was granted him last fall, but owing to urgent professional matters, Doctor Archibald was unable to go to Paris at that time.

The ceremony of presentation took place in the building of the Arts Faculty of McGill, and the new Minister of France to Canada, Comte Robert de Dampierre, visited the University expressly to take part.

The Minister for France was welcomed to the University by Dr. Lewis Williams Douglas, principal and vice-chancellor. Dr. Archibald was then presented to Comte Robert de Dampierre, who in a brief address lauded the achievements of the famous Montreal surgeon. After testifying to the high place which Dr. Archibald has attained in surgical science, the French Minister to Canada formally presented the honorary degree in these words: "I have the very great honour to present to you the degree of Doctor of Medicine of the University of Paris, which is described as the mother of universities in Europe."

Dr. Douglas, in introducing Dr. Archibald to Comte de Dampierre, pointed out that this was a very unique occasion. Present to do honour to Dr. Archibald were the representatives of a great power, France, and of the University of Montreal, the City of Montreal and McGill University. Dr. Archibald's fame as a surgeon was world-wide, but particularly for his breadth of vision, broad culture and spirit of human kindliness, it was his great pleasure to introduce him for this high honour.

J. W. McConnell, a governor of McGill University and warm friend of Dr. Archibald, was present at the ceremony, and with him was Hon. Herbert A. Bruce, formerly Lieutenant-Governor of the Province of Ontario.

The French Minister was accompanied by M. René Turck, French Consul General in Montreal, and by attachés of the legation and consulate staffs. Present at the ceremony were representatives of the University of Montreal, including Msgr. Olivier Maurault, rector; Dr. Adelard Groulx, director of the civic Department of Health; Dr. A. Grant Fleming, dean of the McGill medical faculty, and Prof. J. C. Simpson, associate dean; Prof. René du Roure, head of the department of French at McGill, and others. Among others present from the University of Montreal, in addition to the rector, were Dr. Theo. Parizeau, dean of the faculty of Medicine, Dr. Donald Hingston, and Dr. B. G. Bourgeois.

McGill representatives included Dr. W. W. Chipman, and Dr. C. F. Martin, governors; Dean Charles Hendel of the Faculty of Arts, Dean J. J. O'Neill of Science, Dean Ernest Brown of Engineering, Dr. J. C. Meakins, head of the department of medicine, Dr. A. T. Bazin, professor of surgery; Dr. E. M. Eberts, Dr. Wilder Penfield, Dr. J. R. Fraser, Prof. C. M. McKergow, Mrs. W. L. Grant, warden of Royal Victoria College, Professor Murray, Dr. Owen Stredder, bursar and secretary, T. H. Matthews, registrar, and Col. Wilfrid Bovey.

Saskatchewan

The twentieth anniversary of the first sanatorium in the province was celebrated by the Saskatchewan Anti-Tuberculosis League recently. Messages of congratulation and good wishes came to Dr. R. G. Ferguson, General Superintendent, from all parts of Canada as well as Saskatchewan. Newspapers, both daily and weekly, swelled the chorus and told again the story of Saskatchewan's fight against tuberculosis. The entire province took up the idea, and approximately two hundred towns organized celebrations which took the form of dances at which special speakers briefly referred to the salient points of the campaign, and made a special appeal for the Christmas Seal Fund.

The twenty-year period which was brought to a close in such dramatic fashion is one in which any tuberculosis association could well take pride, and whose record of accomplishment few could equal. Opening its first sanatorium at Fort Qu'Appelle on October 10, 1917, the Saskatchewan Anti-Tuberculosis League went from this beginning to an expansion to 310 beds at Fort Qu'Appelle, a 175-bed sanatorium opened at Saskatoon in 1925, and a 276-bed sanatorium opened at Prince Albert in 1930. Beside the daily clinics at the three sanatoria, clinics are held twice a week at Regina, weekly at Moose Jaw, and, monthly, in six other urban centres. Arrangements for financing treatment began in 1922 with rural pools, extended later to urban pools, and blossomed in 1929 to free treatment for all bona fide Saskatchewan residents. The clinics of course are also free, financed by Christmas Seals.

Dr. R. O. Davidson has made the following statement in regard to maternity grants.

"The maternity grant will be in effect over the whole province as formerly. In the relief areas the gratuity to the mother is still to be paid, but effective September 1, 1937, the gratuity to the physicians for attendance at confinement will not be paid. The reason for this is that the relief medical services plan includes obstetrical care for which the physicians are receiving monthly grants.

"If the gratuities were paid to physicians in the relief areas, the amounts would have to be considered as cash receipts and deducted from the monthly relief medical grant. This would entail much unnecessary clerical work, with no benefit to the physician.

"The gratuities to physicians for completing the pre-natal and post-natal forms will still be paid in the relief areas."

Dr. C. O. Banting, of the Prince Albert Sanatorium, was recently transferred to the Sanatorium at Fort San. Dr. I. C. Molony, of the Sanatorium at Fort San, has taken Dr. Banting's place at Prince Albert. Dr. John Orr, of Moose Jaw, who has had the chest clinics at Swift Current, Regina and Moose Jaw has been transferred to Fort San. Dr. Charles Bennett, of Fort San, has been transferred to Moose Jaw. Dr. Gordon Townsend has returned from overseas, where he studied at Cardiff, Wales. He takes over the children's pavilion and orthopædic cases at Fort San. Dr. A. R. McPherson, of the Sanatorium staff of Prince Albert, has left for England where he will take a six months' post-graduate course.

Dr. J. E. LeBlond, recently of Rosthern, has opened up a general practice in Prince Albert.

The health committee of the Regina City Council has asked Dr. Walton, the M.O.H. to arrange with the Medical Society for the appointment of a committee to confer with them in regard to health insurance for the small-wage earner.

Dr. F. Z. Paulson, a former intern at the Grey Nun's Hospital, has returned to Regina to start practice. He was born at Aberdeen, Sask., and went to high school in Prince Albert and Saskatoon. He took his Bachelor of Science degree from the University of Saskatchewan and his Doctor of Medicine from the University of Manitoba in 1934. During the past two years he has practised in the Colgate district.

Radium from the Eldorado refinery at Port Hope, Ont., will be supplied to the Saskatchewan cancer commission at Saskatoon to replace a missing needle of the precious material, lost several months ago. The new supply is being provided by the insurance company which carried the policy, and does not cost the government anything. It is estimated that its value will be approximately $4,000. LILLIAN A. CHASE

General

Prof. E. V. McCollum, of Johns Hopkins University, is being brought to Canada under the auspices of the Committee on Nutrition of the Canadian Medical Association, who have arranged for his appearance in the Capital City on Saturday, February 19th, which is the last day of the Conference on Medical Research. The Department of Pensions and National Health is also assembling on that day in Ottawa a Nutritional Committee composed of the sub-committee on Nutrition of the Dominion Council of Health and the Scientific Advisory Committee to this Council on Nutrition, comprising five members, making a total of ten.

It has been arranged to have Professor McCollum address the Canadian Club at luncheon, and he is to broadcast over a trans-Canada hook-up from 8.00 to 8.15 p.m. He will also address a public meeting after 8.30 p.m. The ten men who are being assembled and who are associated with the Dominion Council of Health will draw up agenda for consideration of the Canadian Council on Nutrition, which, it is expected, will meet in Ottawa during Easter week.

The American Physicians' Art Association, a national organization of medical men who have ability in the fine arts, will hold a first national exhibition in the San Francisco Museum of Art, San Francisco, California, in June, 1938. (The American Medical Association Convention is on June 13th-17th in the same city). The American Physicians' Art Association already has an outstanding membership. There are three classifications for membership: active, associate, and contributing. The first annual exhibition promises to be of unusual interest with entries to be accepted (after jury selection) in the following classifications: oils, watercolours, sculpture, photography, pastels, etchings, crayon and pen and ink drawings (including cartoons), wood carvings and book bindings. Scientific medical art work will not be accepted. The exhibition is not limited to first showings. All entries close April 1, 1938. Any physician interested should communicate at once with the Secretary of the American Physicians' Art Association, Suite 521-536 Flood Bldg., San Francisco, California.

The XVIth International Physiological Congress will be held in Zürich, Switzerland, August 14 to 18, 1938. All members of the Canadian Physiological Society are eligible to attend and participate in the program.

The International Congress Committee has ruled that it will "accept applications for demonstrations and communications only through National Committees," and has asked the Society to appoint a Canadian Committee to collaborate in the arrangement of the program. The Council of the Canadian Physiological Society has agreed to act as the Canadian Committee, and will be glad to arrange for the acceptance of papers in appropriate fields from members of the Society, or other Canadians.

The Council has agreed on the following conditions for the acceptance of papers: A member may have a paper or demonstration accepted if it is approved by the head of his department, provided the latter is a member of the Society. If the head of the department is not a member, the paper will be accepted if it is approved by a member of the Council. Applications from non-members will be considered also, provided the Council is satisfied that they are eligible for membership in the International Congress. The Council can not undertake to accept more than one paper from any one applicant.

The Secretary has a supply of circulars and cards for making application for membership in the Congress. These may be had by members on application. G. H. Ettinger, Secretary.

The German Society for Investigation of the Circulation will meet on March 26th and 27th at Bad Nauheim, Germany. The chief topic for discussion will be "Collapse of the circulation". All information can be obtained from Prof. Dr. Eb. Koch, Kerckhoff Institute, Bad Nauheim.

Amateur and professional Minnie-Cam. photographers will be gratified to learn that the Jury of the International Exhibition in Paris, 1937, awarded

the firm of Zeiss Ikon AG., Dresden, Germany, two "Grand Prix" for their products in the divisions 14 (photography and cinematography) and 49 (optics). According to information received by the Hughes Owens Co. Ltd., the Canadian distributors, the goods displayed by the Zeiss Ikon at the International Exhibition comprised photographic cameras, sound film reproduction apparatus for ciné theatres and scientific instruments.

Book Reviews

A Method of Anatomy, Descriptive and Deductive. J. C. B. Grant. 650 pp., illust., $6.00. Wm. Wood, Baltimore, 1937.

The standard textbooks of anatomy are as trustworthy and as thrilling as a city directory. This volume is designed to be a record of travel, a journey of exploration through the territory of the human body. It might almost have been entitled, "In Search of Homo Sapiens". An introductory section deals with the meaning of the terms that are employed in the science of anatomy, and the use and care of the simple equipment necessary for practical study. Next there follows a series of chapters covering the Upper Limb, the Abdomen, the Pelvis, the Lower Limb, the Thorax, and the Head and Neck. Finally, a short chapter is devoted to miscellaneous features not specially discussed hitherto. The central nervous system is not described.

The simile of the travel-tour may be carried further. No alluring pictorial scenes are presented, but scale maps are provided in plenty. Each one verified by measurements from actual dissections, they bear the same relation to the ordinary diagram that the blue-print bears to the pencil sketch. By their simplicity of line they invite the student to reproduce them, and in so doing to consolidate the knowledge obtained by the use of his own eyes in a way that only diagrams can do.

Two missiles have generally been hurled by those who would diminish the amount of time devoted by the student to the study of anatomy. The first is that mastery of the subject is a pure feat of memory. The second is that the detail is too voluminous ever to be remembered, and that since a sense of proportion between the important and relatively unimportant is seldom preserved the knowledge so laboriously gained is speedily lost. The first of these objections loses much of its force after one has read a few pages of this book, and is emphatically countered by a perusal of the chapter on the Abdomen. Here, the various viscera are shown to present the relations they do, because in the light of their embryological unfolding they could not possibly do otherwise. A particularly neat illustration is that of the three-leaved book on page 147. In the case of the lower limb the importance of the foot as a kinetic as well as a static mechanism is emphasized. The second objection is sufficiently answered by the fact that the volume runs only to some 600 pages. This alone is sufficient to indicate that the essentials only have been retained, while the non-essentials have been omitted.

A notable feature of the volume is the introduction where possible of "generalizations", such as the fact that muscle cannot play over an unyielding structure and remain muscle, or that although the level at which branches may be given off from a nerve may be variable, the side from which they leave is constant, so that in dissecting a nerve, there is a "side of safety" and a "side of danger". Again, much useful information as to the transmission of strains is demonstrated by reference to the direction of the fibres of ligaments. Function and structure are thus correlated.

It is not too much to say that this is a volume presenting on every page the evidence of an original and singularly attractive approach to a subject which ought to be the most fascinating of all studies. It can be recommended with unqualified approval.

The Pneumonokonioses (Silicosis), Literature and Laws. Book III. G. G. Davis, E. M. Salmonsen and J. L. Earlywine. 1033 pp. Chicago Medical Press, 1937.

In accordance with the plan of the authors enunciated in 1933, Book III contains abstracts of publications on pneumonokoniosis appearing in the literature for 1935 and 1936. In these abstracts essential data are presented concisely but in a form adequate for understanding and sustained interest. As a new feature a medical index is included, which will commend itself to medical practitioners in industrial areas, *e.g.*, there are 29 references under the heading of "animal experimentation" on the subject; papers on differential diagnosis, clinics, post-mortem findings, pneumoconiosis by trades, etc., are listed. A valuable service is rendered to those interested and especially to workers in this field by the translations involved, the opportunity presented to rapidly separate material of a general from that of a specific nature, and the knowledge that no reference of any account is omitted. The second part of the volume contains extracts from Workmen's Compensation and Factory Acts, bearing upon employers' liability for occupational diseases in the states of the United States and in the Provinces of Canada.

Apart from its value as a reference in finding one's way through a voluminous literature on the group of dust-diseases, this book can be read from page to page with interest and help.

British Encyclopædia of Medical Practice. Edited by Sir Humphry Rolleston, Bt. Vol. 4. 600 pp., illust., $10.00 a vol. Butterworth, Toronto, 1937.

This volume begins with the subject of Diarrhœa, treated by Sir Arthur Hurst, and this is amplified by three other articles on various forms of this disease. The chapter on Eczema does not give the prominence to allergy as a causative factor which one would be apt to find in writings on this side of the Atlantic. But still the subject is adequately covered. The article on Disseminated Sclerosis by Dr. F. M. R. Walshe is masterly in its clear presentation. We find no sign of the encyclopædia failing to fulfil its promise of usefulness.

Diseases of the Nervous System in Infancy, Childhood and Adolescence. F. R. Ford. 953 pp., illust., $8.50. C. C. Thomas, Springfield, 1937.

The neurology of childhood is still in an early stage of development. Even the common neurological disorders of this period are to a great extent obscure. The author in this book has brought together all the available information about these conditions in an effort to clarify, in part at least, the present situation. Included are all the conditions which occur in childhood, not merely those which are peculiar to childhood. The neurological complications of diseases not primarily neurological are also given, with a brief discussion of the general aspects of the disease.

In contrast to the customary purely anatomical classification of diseases of the nervous system a pleasing change has been introduced. The grouping of diseases has been based primarily upon etiology with due regard to clinical characteristics. The clinical description of each condition is presented with a brief discussion of pathological anatomy, diagnosis, prognosis and established principles of treatment.

Appended to the description of each disease is a short bibliography. In this, care has been taken to select those references which have been written in English and will be found to be most easily available.

The book is profusely illustrated and the author has in addition presented a number of case histories which help greatly in emphasizing particular features. It will be found to be a most valuable aid to both neurologist and pædiatrician.

Operative Obstetrics. J. M. Kerr, LL.D., M.D., F.C.O.G., with the assistance of Donald McIntyre, M.D., F.C.O.G. and D. F. Anderson, M.D., University of Glasgow. 4th ed., 847 pp., illust., $13.50. Macmillan Co., Toronto, 1937.

The subtitle to this book, "A Guide to the difficulties and Complications of Obstetric Practice" gives a much better idea of its aim and scope. It is the sort of book that the new graduate should add to his library, since it not only covers the indications for and the technique of every manœuvre necessary to the obstetric art, but is the work of perhaps the most outstanding British obstetrician. As is to be expected of a book coming from Glasgow, its section on Disproportion is in the first rank. Munro Kerr has taken a stand, which this section reflects, against the excessive induction of premature labour, which has been British practice for so long, and favours the trial of labour in doubtful cases, which is the practice on this continent. In the treatment of the persistent occipito-posterior position, however, he favours manual rotation, and claims a higher success for it than most of us who have tried it have been able to attain, and dismisses rather curtly such forceps techniques as the Melhado manœuvre, and does not mention De Lee's key-and-lock procedure, with which so many of us have succeeded where the manual method has failed.

As regards accouchement forcé one does not find the condemnation of it that it surely merits, not only is the Bossi method of dilatation of the cervix described but a cut is shown of the truly barbarous instrument with which it is produced. Nor does Dr. Kerr take the clear stand against the employment of high forceps that one would like to see in such a volume. Granted, that in hands like his the operation may be devoid of grave risk, nevertheless in less skilled hands it is responsible for much fetal death and maternal damage. While the chapter on the Induction of Abortion contains considerable valuable argument *re* its indications, there is no section on sterilization, and this is mentioned only as an operation that should be undertaken after not more than four repeated Cæsarean sections. Nor is corpus luteum hormone mentioned in the treatment of habitual abortion. But these are minor points in a book that everyone doing obstetrics should possess.

The Abdominal Surgery of Children. Sir Lancelot Barrington-Ward, K.C.V.O., Ch.M., F.R.C.S.(Edin.), F.R.C.S.(Eng.). Second ed., 333 pp., illust., $7.50. McAinsh & Co., Toronto, 1937.

The vast experience of the author in surgical diseases of children is reflected in this work. The test of a good medical book is the help it gives a physician or surgeon in referring to it for information on common or rare cases. Especially outstanding are the chapters on hernia, congenital hypertrophy of the pylorus, errors in the development of the intestines, and Hirschsprung's disease. It is obvious that much time has been spent in collecting statistics from the author's own experience as well as a complete bibliography. As a reference work it is most helpful. The book covers the subjects completely and authoritatively. The value of the treatise is impressed on the reviewer by re-reading chapters several times. This outstanding and well written book should be in the library of every practitioner who is interested in the abdominal diseases of children. The binding, paper, type and illustrations, reach the high standard that is expected of the Oxford University Press.

Surgery of the Sympathetic Nervous System. G. E. Gask, C.M.G., D.S.O., F.R.C.S., and J. P. Ross, M.S., F.R.C.S. Second ed., 191 pp., illust., $4.75. Macmillan, Toronto, 1937.

That a second edition of this text has been required within four years of publication of the first is a tribute to the merit of this excellent monograph on a somewhat specialized field of surgery. The general arrangement of this edition is similar to the first, but the sections on Sympathectomy for Disorders of the Circulation and Disorders of the Visceral Motor Mechanism have been considerably expanded. Widened clinical experience has enabled the authors to confirm the merits of sympathectomy in vascular diseases (Raynaud's disease and thrombo-angiitis obliterans) and certain disturbances of visceral motor mechanism, notably Hirschsprung's disease. This little volume is an excellent summary of our present knowledge of sympathetic surgery, and can be unreservedly recommended to all interested in this field.

Practical Proctology. L. A. Buie, A.B., M.D., F.A.C.S. 512 pp., illust., $7.25. McAinsh, Toronto, 1937.

This volume follows a book, "The Colon, Rectum and Anus", by Rankin, Bargen and Buie, of the Mayo Clinic, published in 1932. It, however, confines itself to pure rectal lesions, in which Rankin and Bargen do not collaborate. The work covers rectal diseases and their treatment in a conscientious manner. The illustrations are good and the bibliography is complete. The book presents the views and experience of the author and can be recommended to those seeking a general knowledge of diseases of the rectum and anus.

The Endocrines in Obstetrics and Gynæcology. R. Kurzrok. 488 pp., illust., $7.50. Williams & Wilkins, Baltimore, 1937.

This is probably the best book now available on its subject. It begins with an extensive review of the nature and function of the hormones, especially those directly concerned with reproduction. The author has here been at pains to quote the actual facts obtained from clinical observation and experimental data, with due acknowledgments, and at times one feels that a connecting thread of generalization might have made the recital less jerky, especially where he has concentrated on succinctness. In dealing with topics to which he has himself made significant contributions (and there are not a few of these) he has allowed himself more latitude, without always doing full justice to the findings of others, which becomes unfortunate when (as in the assay of female sex hormones in urine) methods decidedly superior to those employed by the author in his own researches have become known. The second half of the book is devoted to menstrual disorders and other aspects of gynæcological pathology with an endocrine background; judiciously selected cases are discussed in some detail, with admirable logic and exemplary use of the recently-gained physiological knowledge. There are several misspellings, especially of foreign names: "Qugenot and Pouse" is a poor shot at "Guyenot and Ponse". The book is attractively produced, and the microphotographs deserve a special word of praise.

The Avitaminoses. W. H. Eddy, Ph.D. and G. Dalldorf, M.D. 338 pp., $4.50. Williams & Wilkins, Baltimore, 1937.

To write a comprehensive and up-to-date monograph on Avitaminosis is, of course, impossible. The subject is too vast to be entirely at the command of one, or even two authors, and much that is up to date today will certainly be out of date tomorrow. The past history of vitamin therapy contains some of the finest examples of empirical medicine at its best; the present presents a panorama of therapeutic possibilities that is almost

fantastic. In spite of the inherent difficulties of the problem the authors have produced a very readable and useful volume, and one that can be understood by practising physicians. As is inevitable the possibilities of vitamin therapy present a veritable therapeutic fairyland. There is no symptom and few diseases of mankind that are not suspected of being, in some way, related to the classical deficiency diseases. The authors are perhaps a little naive in tentatively accepting clinical evidence to support the conceptions of sub-clinical avitaminoses. There are no doubt many abnormal sensations and even pathological changes that will ultimately be shown to be due to relative deficiency of various vitamins, but except in a few instances the evidence for this is still inconclusive and the plausible blandishments of commercial drug houses must be met with hard clinical research. The authors, of course, do not take the responsibility for clinical claims, and the inclusion of the material does not detract from the interest of the book; however, romance and science do not mix well and in future editions, which will be demanded, a more critical attitude might well be accepted.

Altogether the book is a most creditable product in a difficult field and with its many references constitutes the best source of knowledge on the subject.

Physiological Chemistry of the Bile. H. Sobotka, Chemist to the Mt. Sinai Hospital, New York. 202 pp., $3.00. Williams & Wilkins, Baltimore, 1937.

This book is an attempt to combine in short space the conclusions from a voluminous literature on the physiological, pharmacological and pathological facts concerning bile acids and the other chemical constituents of bile. The bibliography and authors' index appended give an additional 50 pages. The conclusions given are those of the authors cited, with, in many instances, a brief comment by the writer, who hopes to stimulate those particularly interested in biliary disease to deeper and clearer conception of the liver as a secretory organ whose physiological activities have been more ignored than those of any other organ and yet probably are more far-reaching in body economy. The clinical facts are fully modern and justifiably critical. The book is worth reading twice.

A Guide to Medical Case Reporting. Published by the Department of Medicine, McGill University. $0.50. Renouf Pub. Co., Montreal, 1937.

We do not know of any book quite like this. There are many textbooks on physical diagnosis, and they usually have a chapter on history-taking. But what a student wants in taking a case-history is a good working model which he can keep before him. That is provided by this book. It is admirably direct and concise, and it can be carried in the pocket. It contains a section on "Diary Writing" by Dr. G. A. Copping, which is certainly not to be found in the ordinary textbook. Dr. Copping obviously draws on an extensive experience in the training of students to write case reports, and the benefit of this is given in his fresh and pertinent comments. He has instinctively realized that one of the best ways to teach is to point out common errors. Some may object to the order of the case report which calls for the family and personal history before the history of the present illness, but the arguments for either arrangement seem to be equally cogent, and a student will learn by degrees to select whichever suits him best. It is better perhaps that he should be given one systematized plan at first. The Department of Medicine of McGill is to be congratulated on this coordination of its teaching methods.

Physical Diagnosis. D. C. Sutton. 495 pp., illust., $5.75. McAinsh, Toronto, 1937.

This book represents the sifted experience of several years' teaching in the Medical Clinics of Northwestern University, and in the medical wards of the Cook County Hospital. It is clearly written and gives all the modern methods of physical examination. The illustrations are numerous and interesting. There are, however, different ideas as to what illustrations should be used. To the mind of the reviewer there are many which might well have been omitted: *e.g.*, that of cachexia in advanced carcinoma; of extreme inanition; of various stethoscopes; of types of fever; of most of the x-rays of the lungs, particularly one showing "early apical tuberculosis", where the disease is certainly not *early*, and of acromegaly on page 102. Apart from these, we think that the book will be useful.

Maternal Deaths—the Ways to Prevention. I. Galdston, Secretary, Medical Information Bureau, New York Academy of Medicine. 115 pp., $0.75. Commonwealth Fund, New York, 1937.

Dr. B. P. Watson in the Foreword explains that the present volume is an interpretation for the non-medical reader of the studies made by the New York Academy of Medicine and other bodies on maternal mortality. Dr. Galdston, in a simple direct style, presents the nature and extent of the problem; he then indicates the possibilities of prevention, pointing out the patient's contribution as well as the physician's contribution, which are required to solve the problem. The dangers arising out of inadequate care, low standards of hospital service, the abuse of operative procedures, and the dangers associated with the indiscriminate use of anæsthetics are made clear. All this leads up to the concluding section "What can be Done", and here the author stresses public education, the quality and adequacy of facilities, and concludes that "It is possible within the given economic order to effect a very marked reduction in maternal mortality by making more effective use of our knowledge and resources".

This publication is recommended to the medical practitioner who has not the time to read and digest the original studies which provide the factual material. It could with advantage be read by any intelligent person, providing as it does a logical approach to a subject which is too often dealt with at an emotional level.

Doctors on Horseback: Pioneers of American Medicine. J. T. Flexner. 370 pp., illust., $3.00. Macmillan Co., Toronto, 1937.

This book is a fascinating study. Mr. Flexner writes with the facility of the trained litterateur, which he is. He also has the medical background which his subject demands, for he is the son of Dr. Simon Flexner. Under the circumstances we would expect a finished product and we are not disappointed. The author belongs to the psychoanalytical school of biographers, but not oppressively so. He has taken certain outstanding figures in American Medicine, representing epochs in its development, and has described them and their associates with a sure touch that enables us not only to see them as they doubtless were but at the same time gives us a picture of the times and places in which they moved. We are introduced to John Morgan, William Shippen Jr., and Benjamin Rush, representing the revolutionary and immediate post-revolutionary period. We meet Ephraim McDowell, the first surgeon who was bold enough to open the abdomen and remove an ovarian cyst. We get a graphic description of the operation and its later consequences. We meet Daniel Drake, the pioneer medical man of the Ohio Valley, the founder of medical schools. We meet William Beaumont, the first experimental physiologist of importance since Harvey. We are told the story of the introduction of sulphuric ether as an anæsthetic, of the controversy as to priority, and of the sad ending of the principals concerned. Some may be disposed to deny the term "great" to these men, nevertheless they were men of enterprise, courage and wide vision. We may be disposed to wonder and perhaps laugh at

the vigour of their animosities, but those were the days when the thick stick was preferred as an argument to the kid glove. We do things differently now, but perhaps we are no better! At any rate, Mr. Flexner's "pioneers" did things the effects of which have lasted unto this day, and for that reason, if no other, they are entitled to a lasting niche in the Temple of Honour. "Doctors on Horseback" is a welcome addition to the shelf of books dealing with medical history.

American Medicine: Expert Testimony Out of Court. Published by the American Foundation, 565 Fifth Ave., New York, 1937: 2 vols., $3.50.

It is quite hopeless to attempt a short review of such a work as this. It is a report summarizing the results of an inquiry to medical men begun by the American Foundation some 18 months ago. The idea was to collect directly from medical men their views on the present system of medical care. Comments were to be as free as possible, and apparently they have not suffered from suppression. The result is an unusually full and representative expression of opinion. The first seven sections describe present trends in medical practice and education. The last four sections discuss various proposals for "distributing" medical care and lowering its cost, and for organizing medical care and public health services. The latter part therefore is more speculative than the first.

The book is a valuable contribution to this vital question of medical care, and is of equal interest to physician and layman, especially those in political quarters.

A Social Problem Group. Edited by C. P. Blacker, M.C., M.A., M.D., F.R.C.P. 228 pp., $4.50. McAinsh, Toronto, 1937.

Dr. Blacker presents in this book a series of articles by a number of authors who have attempted to make a study of various types of abnormal people with a view to determining the relationship between their abnormality and the type of social problem they present in different community settings. Such abnormal conditions as intellectual retardation and mental deficiency, epilepsy, alcoholism, delinquency, and neurasthenia are presented, with some statistical evidence to indicate the fact that the lowest 10 per cent of the social scale of most communities is largely composed of individuals with the above-mentioned mental abnormalities. The miscellaneous grouping of these various abnormal types into a social problem group may be justifiable from an economic standpoint. The main objective of this publication is evidently to emphasize the possible hereditary factors in these various abnormal mental types, but there is very little evidence in the material presented to suggest that there is such a definite hereditary basis. For those who may be interested in problems of social maladjustment and the eugenic approach to such problems this book will prove interesting.

Story of a Great Hospital: The Royal Infirmary of Edinburgh, 1729-1929. A. L. Turner, M.D., LL.D., Hon. F.R.C.P.(Edin.). 422 pp., illust., 10s. net. Oliver & Boyd, Edinburgh, 1937.

This book is more than the story of a great hospital; it is an account of the preservation and development throughout the ages of the "Hippocratic ideal". In the earlier pages we are led from Cos to Salerno, to Bologna, Padua, Montpellier, London, Leyden and Edinburgh. We learn much about the "Edinburgh tradition" and its effect on American medicine, on Philadelphia, New York and Montreal. We read about Hippocrates, Fallopius, Harvey, Linacre, Sylvius and Boerhaave, the Monros, Rutherford, Syme, Lister, Pitcairne, Morgan, Shippen, Rush and Bard and many others not less renowned. Speaking for Canada, instruction, coupled with the check of post-mortem study, has been the rule at McGill University since the inception of its medical faculty in 1823, for the four founders of its medical school, Holmes, Robertson, Stephenson and Caldwell, were Edinburgh men. By now the "Edinburgh tradition" is accepted universally, among the English-speaking medical world at least, as the ideal.

With the story of the Infirmary is bound up the story of the origin and development of the Edinburgh schools of medicine. Coincident with the paling of the star of Leyden brightened the star of Edinburgh, until Edinburgh became the Mecca of the medical student from Great Britain and most parts of the Empire. We are told, also, of the development of the voluntary hospital system, not only in Scotland but also in England. Naturally, the central theme is the origin and growth of the Royal Infirmary, and this is developed in detail and is well documented. All medical graduates of Edinburgh will delight in this book, and all those who are interested in an important epoch in the history of medicine should read it. The book is beautifully produced and is a bountiful ten shillings' worth.

Medical Records in the Hospital. M. T. MacEachern, M.D., C.M., D.Sc., F.A.C.P., F.A.C.H.A. 374 pp., illust., $3.50. Physicians' Record Co., Chicago, 1937.

In the development of hospital efficiency and the advancement of our medical knowledge medical records have played a large part. During the past two decades a tremendous change has taken place in the extent and value and in the use and study of these records. It is fitting that Dr. Malcolm T. MacEachern should have written this work, as he, more than any other person, is responsible for the improvement of clinical records on this continent. In this volume, which is an amplification of the chapter on Records in his recently published "Hospital Organization and Management", Dr. MacEachern considers at some length the contents and form of the medical records in the various departments, the preservation of the records, their use, and the qualifications and training of the record librarian. He has an excellent chapter on clinical photography and a lengthy section on the hospital medical library, including a list of recommended texts and journals. There is an interesting section on footprints and handprints as a means of identification of the newborn by Dr. G. P. Pond, of Oak Park, Ill. This helpful volume should be in the medical library of every hospital and should be read by every staff member and intern.

A Textbook of Surgical Nursing. H. S. Brooks, Jr., M.D. 632 pp., illust., $4.00. McAinsh & Co., Toronto, 1937.

This is a very complete outline of the surgical conditions likely to be encountered by the nurse in hospital or private practice. The volume is well written and profusely illustrated. On the whole it would appear to be a work on surgery written for nurses rather than a treatise on surgical nursing, as the practical aspects of surgical nursing are not particularly featured. However, there is a good chapter on special procedures, such as catheterization, gastric lavage, etc., and a short chapter on medico-legal points of concern to nurses. The book may be recommended.

Greek Medicine. F. B. Lund, M.D., Boston. Clio Medica Series, No. 18. 161 pp., illust., $2.50. P. B. Hoeber, New York, 1936.

This small volume is one of the best of the "Clio Medica" series. Although early Greek Medicine has perhaps received less attention than one might wish the later period has been given adequate treatment. It would be hard to find a better estimate of Galen's influence of medical progress in so short a space.

Classified Advertisements

FOR SALE, in north Toronto near Yonge Street, practice, office furniture and instruments. Practice established 18 years; owner deceased. House moderate size. Apply Box 288, Canadian Medical Association Journal, 3640 University Street, Montreal.

FOR SALE OR RENT.—The home and practice of the late Dr. F. S. Rounthwaite, 2140 Queen Street East, Toronto. For further information apply to Mrs. F. S. Rounthwaite at above address or telephone HOward 8085.

WANTED.—Pathologist, male, full time. Applicant please state age, qualifications and salary expected, to Holy Cross Hospital, Calgary, Alberta.

ASSISTANTSHIP WANTED.—Young British ophthalmic surgeon, D.O.M.S., desires assistantship in Canadian ophthalmic practice or industrial concern. Apply Doctor B. Sheehan, 4 Portland Square, Carlisle, England.

Phenomenon of Local Tissue Reactivity. G. Shwartzman, M.D. 461 pp., illust., $7.50. P. B. Hoeber, New York, 1937.

This is no book for the general practitioner. It is a valuable work for the bacteriologist and immunologist by one whose name is amongst the foremost of such investigators.

Practical Treatise on Diseases of the Skin. O. S. Ormsby, M.D. Fifth ed., 1334 pp., illust., $12.00. Lea & Febiger, Philadelphia, 1937.

One can only repeat the admiration expressed over previous editions of this work. Nothing of practical interest is omitted. The illustrations are fully up to the standard of excellence one expects from this publisher.

Chemistry of the Brain. I H. Page, A.B., M.D. 444 pp., $7.50. C. C. Thomas, Springfield and Baltimore, 1937.

A detailed and comprehensive review of a complex subject.

BOOKS RECEIVED

Laboratory Diagnosis of Syphilis. Harry Eagle, M.D. 440 pp., illust., $5.75. McAinsh, Toronto, 1937.

Mecanismo Probable de la Cancerizacion. A. Garibaldi, Professor de la Facultad de Ciencias Medicas. 2 vols. Published by Universidad Mayor de San Marcos, Lima, Peru, 1936.

The Culture of the Abdomen. F. A. Hornibrook. Eleventh ed., 92 pp., $1.75. Macmillan, Toronto, 1937.

Manual of Practical Tropical Sanitation. J. B. Kirk, M.B., Ch.B., M.R.C.P., D.P.H., D.T.M.&H., Director, Medical and Health Department, Mauritius. 300 pp., $2.25. Macmillan, Toronto, 1937.

Treatment of Some Chronic and "Incurable' Diseases. A. T. Todd, O.B.E., M.B., M.R.C.P. 203 pp., $3.00. Macmillan, Toronto, 1937.

Some Fundamental Aspects of the Cancer Problem. Edited by H. B. Ward. No. 4, Supplement to Science, vol. 85. 248 pp., illust., $2.50. Science Press, New York, 1937.

Medico-legal Aspects of the Ruxton Case. J. Glaister and J. C. Brash. 284 pp., illust., $6.25. Macmillan, Toronto, 1937.

Practical Neuroanatomy. J. H. Globus. 387 pp., illust., $6.00. University of Toronto Press, Toronto, 1937.

Tissue Reactions in Bone and Dentine. A. Wilton, Stockholm. 194 pp., illust., 15s. Henry Kimpton, London, 1937.

Physical Therapy in Arthritis. F. H. Krusen. 180 pp., illust., $2.25. P. B. Hoeber, New York, 1937.

Concepts and Problems of Psychotherapy. L. E. Hinsie. 199 pp., illust., $2.75. Columbia University Press, New York, 1937.

Perspectives in Biochemistry. Edited by J. Needham and D. E. Green. 361 pp., $4.50. Macmillan Co., Toronto, 1937.

Practical Guide to Massage. C. I. Carpenter. 127 pp., $1.50. Macmillan Co., Toronto, 1937.

Minor Maladies and Their Treatment. L. Williams, M.D. 7th ed., 439 pp., $3.00. Macmillan Co., Toronto, 1937.

Physical Signs in Clinical Surgery. H. Bailey, F.R.C.S. 6th ed., 284 pp., illust., $6.25. Macmillan Co., Toronto, 1937.

The Thinking Body. Mabel E. Todd, New York. 314 pp., $4.00. P. B. Hoeber, New York, 1937.

Behaviour Development in Infants. E. Dewey. 321 pp., $3.50. Columbia University Press, New York, 1935.

Short-wave Diathermy. T. de Cholnoky. 310 pp., illust., $4.00. Columbia University Press, New York, 1937.

Arteriovenous Aneurysm. E. Holman. 244 pp., illust., $5.00. Macmillan Co., New York, 1937.

Practical Methods in Biochemistry. F. C. Koch. 2nd ed., 302 pp., illust., $2.25. William Wood, Baltimore, 1937.

Principles and Practice of Rectal Surgery. W. B. Gabriel. 2nd ed., 363 pp., illust., 28s. net. H. K. Lewis, London, 1937.

General Hygiene and Preventive Medicine. J. Weinzirl. Edited by A. Weinzirl, Health Officer, Portland, Ore. 424 pp., $4.00. Lea & Febiger, Philadelphia, 1937.

Therapeutic Problem in Bowel Obstructions. O. H. Wangenstein. 360 pp., illust., $6.00. C. C. Thomas, Springfield, Ill., 1937.

Neurology. R. R. Grinker, M.D. 2nd ed., 999 pp., illust., $8.50. C. C. Thomas, Springfield, Ill., 1937.

The Postmortem Examination. S. Farber. 201 pp., $3.50. C. C. Thomas, Springfield, Ill., 1937.

Pseudocyesis. G. D. Bivin, Ph.D. and M. P. Klinger, M.A. 265 pp., $4.00. Principia Press, Bloomington, Ill., 1937.

Functional Activities of the Pancreas and Liver. C. W. McClure. 318 pp. Medical Authors' Publishing Co., New York, 1937.

Biological Standardization. J. H. Burn. 288 pp., illust., $6.50. McAinsh, Toronto, 1937.

Prognosis in Schizophrenia and the Factors Influencing the Course of the Disease. G. Langfeldt. 228 pp., $3.75. McAinsh, Toronto, 1937.

Practical Physiological Chemistry. P. B. Hawk and O. Bergeim. 11th ed., 968 pp., illust., $8.00. P. Blakiston's Son & Co., Philadelphia, 1937.

The Little Things in Life. B. Sure, Ph.D. 340 pp., $2.75. Ryerson Press, Toronto, 1937.

The Business Side of Medical Practice. T. Wiprud, Exec. Secretary, Medical Society of Milwaukee County. 177 pp., illust., $3.00. McAinsh, Toronto, 1937.

Proceedings of the Second National Conference on College Hygiene, Washington, D.C., December 28-31, 1936. 112 pp. Published by National Tuberculosis Association, New York, 1937.